Understanding Pregnant Maasai Women's Nutrition Patterns and Beliefs Regarding Pregnancy Outcomes

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Abstract

The purpose of this study is to enhance the understanding of Maasai women's traditions in the Ngorongoro Conservation Area Authority (NCAA). This study focuses on practices surrounding nutrition during pregnancy as well as the women's beliefs in respect to how nutrition affects pregnancy outcomes. The intent of this research is to inform future programming for the Mama Kwanza Clinics by exploring the dynamics of pregnancy among Maasai women. This qualitative study uses an interpretive description methodology, using individual interviews and dietary recalls, with a content analysis. One on one interviews with pregnant Maasai women living in the NCAA are the primary data collection method. A second method of data collection includes a diet recall journal where each participant recorded what she had eaten in the 24 hours prior to the interview. Shared insights revealed five themes that reflect Maasai women's perception respecting nutrition and healthcare during pregnancy, current dietary patterns, rationale for dietary restrictions, and barriers to seeking professional healthcare. These five themes include: a) Eating less food lets baby come easier; b) Not producing food means more dependence; c) Working hard harms my baby; d) Knowing what is needed for a good pregnancy; e) Preferring our traditional ways for pregnancy and birth. At a local level, these findings suggest that, by incorporating education and home visits, community clinics can decrease barriers for Maasai women seeking professional health care during the prenatal care experience. Inclusion of traditional birth attendants and family members in prenatal care decisions can support cultural safety, thereby encouraging Maasai women to attend prenatal visits without challenging their beliefs and traditional practices. Earlier prenatal care visits can also increase prevalence and duration of prenatal supplementation, while potentially decreasing micronutrient deficiencies and birth complications. At a policy level, these findings may inform the need for evaluation of current agriculture and livestock policies, as well as food fortification and supplementation programs.

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CHAPTER ONE

1.1. Background

This study is set in the world of a unique pastoralist society which conjures images of peace and a sense of simplicity and security. It is often seen from the outsiders lens as colourful, novel, and somewhat mysterious. However, it is also set in a context of differences and historical nuances that are obscured by the perceived mystique of an iconic lifestyle of pastoralism and nomadism.

1.1.1 The Maasai.

The study occurs in the world of the Maasai people who originally migrated from the lower Nile valley north of Lake Turkana to the south to where they now reside in parts of northern Kenya and central Tanzania (Ngara, n.d). The Cushitic groups had previously inhabited the land in which the Maasai migrated, forcing the Cushitic groups to assimilate to the Maasai culture, this resulted in a mixture of populations forming multiple clans of Maasai groups (Ngara). The Maasai speak the language of Maa, which is subdivided into northern Maa and southern Maa (Ngara). Through the assimilation process of other ethnic groups into Maa they adopted various customs and practices such as the "age set system" of social organization and circumcision (Ngara). The Maasai are a strong patriarchal society with the elder men being in charge of any and all major decisions for the Maasai population (Ngara). An age set system is usually defined by a group of males or females in a society who share a common identity and maintain a close proximity throughout their lives, passing through age-related statuses together as a group (O'Niel, 2007). One of the most important practices in the Maasai community is the male circumcision, when the young Maasai boys are welcomed into manhood and accepted as

warriors to presume full responsibility for the security of their territory (Maimai, 2006).

The Maasai traditionally live in single or extended family dwellings, arranged in a circular fashion, called a "boma" (Maimai, 2006). A boma is demarked by a ring of acacia thorns, used to keep cattle and other livestock in and to prevent wild animals from entering. Prior to the colonial government, the communal lifestyle of the Maasai was designed to provide security and remain self-sufficient as a community (Ngara). Traditionally, the communal lifestyle of the Maasai brought a strong sense of connectivity throughout the community, it took many hands to run a household, raise an infant, and feed and support a family. All elder women of the community were referred to as Mother and all elder men referred to as Father (Ngara). In 1968 the Kenyan government passed the Act of 1968 advocating the development of group ranches (Ngara). These group ranches were developed as a way to assimilate Maasai economy by moving the land and animals from communal traditions to individual ownership and management (Ngara). This new individualized system also brought with it an elected committee who oversaw the management of the ranch and had the right to incur debts and enforce its decisions onto its members (Ngara, n.d.). These colonial changes brought disruption to traditional land management systems, settlement patterns, and family structure of the Maasai people (Ngara, n.d.).

It is important to note that there is no specific national policy or policies respecting Indigenous peoples in Tanzania. Although there was a positive support for the United Nations Declaration of the Rights of Indigenous People in 2007, Tanzania has continued to remain silent on the recognition of Indigenous peoples, including the Maasai within its own borders (International Work Group for Indigenous Affairs, 2015). In fact, "a number of policies, strategies and programmes that do not reflect the interests of the indigenous peoples in terms of access to land and natural resources, basic social services and justice are continuously being

developed, resulting in a deteriorating and increasingly hostile political environment for both pastoralists and hunter-gatherers" (International Work Group for Indigenous Affairs).

1.1.2 The Maasai and Food Security

The Maasai peoples rely on their herds of cattle, goats, and sheep as primary sources of income, selling, or trading the meat and milk of the animals in return for other livestock or money (Maimai, 2006). Traditionally the diet of the Maasai was primarily meat, milk, and blood from cattle (Maimai, 2006). Maasai would drink the blood of cattle on special occasions, and give to people during circumcisions, childbirth, or when they are sick (Maimai, 2006).

The Maasai have faced many nutritional challenges within the Ngorongoro Conservation Area Authority (NCAA), which lead to poor diet variability and instability. During times of diminishing land and plot sizes for cattle grazing, some Maasai would cultivate maize, rice, potatoes, and cabbage in order to supplement nutritional needs (Maimai, 2006). In 1959, the NCAA separated from the Serengeti National Park, allowing the Maasai to inhabit the NCAA, but excluding them from living in the Serengeti National Park (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2010). The NCAA borders the Serengeti National Park in the northwest, extending to the eastern edge of the Great Rift Valley (UNESCO). The changes in climate, altitude, and landforms, varying from savanna woodlands and forests, savanna, and highland plains with alternating fresh and brackish water lakes and swamps, result in overlapping ecosystems and distinct habitats (UNESCO, 1997; 2010). In 1975, the Government of Tanzania banned agriculture in the NCAA under the *Ngorongoro Act of 1975*, proclaiming its status as a World Heritage site (Mushi, 2013; UNESCO, 2010). In 1992, the NCAA established policy that the Maasai be encouraged to move, resulting in 200 Maasai families being evicted in 2003 as illegal immigrants (UNESCO, 2010). Cultivation restrictions and factors, such as diminishing livestock numbers, droughts, environmental changes, and an

increasing population, have continued to negatively impact the lives of the Maasai peoples continuing to reside in the NCAA (Mushi, 2013).

Recently, the Prime Minister of Tanzania addressed diminishing food availability and decreasing cattle numbers in NCAA by supplying free food rations every year and permitting Maasai to graze their cattle within the crater on the condition of daily entry and exit (Mushi, 2013). In October of 2013, 7,000 tonnes of maize were delivered to the 87,000 NCAA residents along with the commitment of annual ongoing support of 10 bags per family (Nkwame, 2013). As a result, the Maasai have begun to rely primarily on maize (60% calories/day) provided through relief food programs to meet their dietary needs (Brady, Suksiri, Tan, Dodds, & Aine, 2008).

The Food and Agriculture Organization of the United Nations (FAO) established four dimensions of food security at the household level: food availability, food access, utilization, and stability (FAO, 2006). Access to nutritious foods is not just affected by the inability to cultivate land in the NCAA but also by the time and effort the Maasai put into gathering fruits and vegetables. Food stability includes consistent access to clean food and water, unaffected by the sudden environmental or economical changes (FAO, 2006). The Maasai are seasonally impacted by food availability, especially during droughts or dry seasons which limit access to clean water, fruits, and vegetables, in turn yielding food instability.

1.1.3 Indigenous Knowledge and Prenatal Food Practices

As one considers the health beliefs and behaviors in many traditional societies, it is imperative to recognize that indigenous knowledge(s) are the foundation in many if not all of these cultural groups. Far too often, these local ways of knowing are overshadowed by the scientific domains. As eloquently stated by Nakashima, Prott, and Bridgewater (2000).

Sophisticated knowledge of the natural world is not confined to science.

> Human societies all across the globe have developed rich sets of experiences and explanations relating to the environments they live in. These 'other knowledge systems' are today often referred to as traditional ecological knowledge or indigenous or local knowledge. They encompass the sophisticated arrays of information, understandings and interpretations that guide human societies around the globe in their innumerable interactions with the natural milieu … (p. 12).

According to Tagalik (2010), "cultural health is the basis for every other kind of health because in it resides the sense of identity, the collective social supports for the individual, and the sense of belonging grounded in loving, healthy and supportive relationships" (p. 3). Prenatal food practices are therefore grounded in deeply integrated systems of cultural health and Indigenous knowledge.

1.1.4 Pregnancy and lactation needs: Global perspective.

Women's nutritional needs increase during pregnancy and lactation. The World Health Organization (WHO) (2001) has developed international guidelines related to calorie consumption and weight gain for women during pregnancy. WHO recommends that pregnant women consume 200-300 extra calories per day throughout the second and third trimesters, with an anticipated average weight gain of 10-12.5 kilograms. Tanzania has limited information on the current nutrition and weight gain patterns of Tanzanians generally, and pregnant women specifically. Muhimbili University of Health and Allied Sciences, the Tanzania Food and Nutrition Centre, and Harvard School of Public Health established a food composition table known as the Tanzania Food Composition Table (TFCT) to help guide healthy dietary choices (Lukmanyi, Hertzmark, Mlingi, Assey, Ndosi, & Fauzi, 2008). The focus of the TFCT is on quality of food rather than quantity and does not specify recommendations for the quantity of food necessary for adequate weight gain during pregnancy. The TFCT potentially contributes to

knowledge on common Tanzanian food and meals; however, in its current format the guidelines have a limited role for proper nutrition and food intake during pregnancy.

1.1.5 Traditional dietary practices during pregnancy: Maasai perspectives.

Traditionally during pregnancy, Maasai women consume a modified diet, restricting caloric consumption during the third trimester (7-9 months) (Brady et al., 2008). This dietary restriction is believed to ensure smaller babies, thereby easing delivery and limiting medical intervention during childbirth (Brady et al., 2008). Community elders often enforce this practice in the first pregnancy, although women opt to follow this pattern in subsequent pregnancies. Martin, Petrucka, and Buza (2014) studied Maasai women's current dietary patterns and discovered that, on average, they have a lower intake of carbohydrates, proteins, and fats per day than the TFCT recommendations. In addition to poor variation of foods, due to cultivation restrictions, pregnant Maasai women are commonly limited to one or two meals per day, while continuing to perform high energy expending duties such as tending cattle, building houses, and collecting food and water. These daily activities limit their access to food while increasing their metabolic expenditures; hence, creating a calorie deficit in their daily nutritional needs (Brady et al., 2008; Martin et al., 2014; Oiye, Simel, Oniang'o, & John, 2006). Cultural practices during pregnancy also limit the women's intake of certain foods, such as sugar, certain herbs, sheep meat, sheep intestines, meat of animals that have died of unknown causes, and the milk of sick cows (Mawani, 1997). Maasai women avoid foods that are rich in protein, such as milk, meat, and beans during pregnancy, and increase their water intake in anticipation of reducing the size of the babies thus easing deliveries (Brady et al, 2008; Martin et al., 2013). Conflicts between cultural traditions and food cravings also arise in some Maasai women during pregnancy. They feel that cravings are the body's way of telling them what they need; however, some cravings conflict with cultural practices during pregnancy (Mawani, 1997) making it increasingly difficult

to continue to place traditions above their needs.

On average, Maasai women gain 11% of their body weight during pregnancy, which is lower than women in the United States and Europe where the norm is between 15 to 25% (Brady et al., 2008). Approximately 13% of Maasai infants are categorized as low birth weight (LBW) (Brady et al., 2008) compared with an average 6.9% in Europe (Organization for Economic Co-operation and Development, 2012).

Many factors influence pregnancy outcomes, such as poor maternal nutrition, birth spacing, maternal age (under 15 years or over 35 years), inadequate prenatal care (PNC), lifestyle behaviors, and poverty (Mosha & Philemon, 2010). This study explores the current dietary patterns of Maasai women during pregnancy including their perceptions on how their diets impact maternal and child outcomes.

1.2 Cultural Safety: A Theoretical Lens

Because of this study's unique cultural setting, which has remained highly traditional, I tried to engage in using what I considered an optimal approach. Further, when I, considered the intimate period of pregnancy and the role of women within this context, I realized each facet of this work would potentially bring new understanding to the complexities. Admittedly, in this setting, it is possible to consider many perspectives – post-colonialism, community development, global health, ethnography, feminism(s) – to mention a few. In this study, it was the lens of cultural safety that gave focus to the work. Cultural safety is "the effective nursing of a person or family from another culture, and is determined by that person or family. Culture includes, but is not restricted to, age or generation; gender; sexual orientation; occupation and socioeconomic status; ethnic origin or migrant experience; religious or spiritual belief; and disability" (Nursing Council of New Zealand, 2011, p 7). When entering a community as an outsider, it is important to address personal biases and misconceptions that can alter the way you think, or act towards

the members of that community. Cultural safety is not just the knowledge of customs and traditions of a specific ethnic group, rather it is recognizing and respecting the differences in individuals and providing care in the best way that fits their personal needs (Papps & Ramsden, 1996).

1.3 The Researcher's Lens

As a female Canadian nursing student, I was able to spend the last couple of months of my degree in Tanzania, learning about the local health system, various cultural practices, and the wants and needs of the Tanzanian people respecting health care. I was drawn to the Maasai people, fascinated by their way of life which, in turn, motivated me to learn more about Maasai traditions and beliefs in relation to health and wellness. As I became more familiar with the Maasai culture I developed an interest in their traditions surrounding nutrition during pregnancy and neonatal health in their community.

As a Canadian Registered Nurse, I recognized the potential for nutrient deficiencies in this community and was curious about how this impacted pregnancy outcomes beyond our borders. I wanted to understand the meaning behind dietary restrictions in Maasai pregnancies, why they practiced these traditions, and how these decisions potentially impacted mothers and children. I also recognized that in Canada we are exposed to a wide diversity of newcomers and immigrants who come with diverse beliefs and practices and by exploring the Maasai traditions I hoped to broaden my personal and professional contributions and learn how to integrate and incorporate the traditions of newcomer populations in a more culturally safe manner.

CHAPTER TWO

Literature Review

The literature search was done using the following databases: CINAHL, Medline, PubMed, Global Health, Google, and Google Scholar. The keywords included Maasai, Women, Pregnancy, Nutrition, Traditions, Prenatal/Antenatal Care, and Ngorongoro Conservation Area. These words were searched individually and in various combinations. Some searches were further refined to 1990-2015, female, Africa, and peer reviewed journals. The references of the articles used were also manually scanned in order to identify further literature on the subject that may not have been found using the specific databases.

2.1 Maternal and Newborn Health and Nutrition: Global

Globally, 20 million infants (15.5% of all births) are categorized as LBW, with 95.6% of these neonates being in developing countries (United Nations International Children's Emergency Fund [UNICEF] & WHO, 2004). Low birth weight is defined as weight less than 2,500 grams at birth (Wardlaw, Blanc, Zupan, & Ahman, 2004). In this review, LBW is highlighted as a major determinant of adverse birth outcomes in developing countries. Low birth weight is often strongly associated with under-nutrition, preterm births, iron deficiency anemia in pregnant mothers, and intrauterine growth restriction (IUGR) (Wardlaw et al., 2004). For the infant, LBW is the primary determinant of neonatal mortality in developing countries (Klingenberg, Olomi, Oneko, Sam, & Langeland, 2003). A LBW infant is at an increased risk for health problems, such as infections, delayed motor skills and social development, as well as learning disabilities (Alderman, Hoogeveen, & Rossi, 2005; Center for Disease Control and Prevention [CDC], 2014).

Maternal and child under-nutrition remains one of the leading causes of morbidities and mortality in children under the age of five (Black, Allen, Bhutta, Caulfield, de Onis, Ezzati,

Mathers & Rivera., 2008). Under-nutrition along with nutrition related factors, such as multiple micronutrient deficiencies and sub-optimal breastfeeding practices, contribute to 35% of childhood deaths and 11% of the total global disease burden (Black et al., 2008). Women in developing countries who experience conditions of socioeconomic deprivation are at an increased risk for perinatal and neonatal deaths due to malnutrition and micronutrient deficiencies (Bhutta, Darmstadt, Hasan, & Haws, 2005).

Malnutrition in women from developing countries occurs throughout the lifecycle (Huffman, Baker, Shumann, & Zehner, 1998), but becomes increasingly evident during the reproductive years. A female who was malnourished as a fetus, young child, or adolescent is more likely to enter pregnancy malnourished, therefore compromising the nutritional status of her future child (Child Survival Collaboration and Resources, 2004; Huffman et al., 1998). Women who enter childbearing years in a malnourished state are at a greater risk of placental insufficiencies causing intrauterine growth restriction (IUGR) during pregnancy (Peleg, Kennedy, & Hunter, 1998). IUGR can be classified as symmetrical or asymmetrical. Symmetrical IUGR results in a fetus whose entire body is proportionately small (Peleg et al., 1998), whereas asymmetrical IUGR is caused by malnutrition causing placental insufficiency which results in the fetal energy sources being redirected to preserve vital organs (i.e., brain, heart) at the expense of the liver, muscles, and fat (Peleg et al., 1998). The results of asymmetrical IUGR include a normal fetal head dimension but a small abdominal circumference, skinny limbs, and thinned skin (Peleg et al., 1998)

The Food and Agriculture Organization of the United Nations (FAO) and The World Health Organization (WHO) recommend the compositional percentage of macronutrient energy consumed by the average person to be 55-75% from carbohydrates, 15-30% from fats, and 10-15% from proteins (FAO & WHO, 2003). An observational study on maternal diet and neonatal

outcomes in rural India showed lower birth weights (on average 2.7 kg birth weights) in women consuming less protein and green leafy vegetables (Fall, Yajnik, Rao, Davies, Brown, & Farrant, 2003). The typical diet of pregnant mothers, in this region, included bread, pulses, and some variation of green leafy vegetables with 40% of women consuming meat less than once per week (Fall et al., 2003). A similar study in New Delhi recorded the current dietary intake of 100 pregnant women and found that prior to nutritional education, the women consumed less than the recommended daily intake (RDI) of all major food groups including: cereals and sugars (40-50% of the RDI), pulses and vegetables (20% of the RDI), and proteins (40% of the RDI) with a daily mean caloric intake of 835-924 kcal (Garg & Kashyap, 2006). Further, 96.3% of women in this study were classified as anemic (Garg & Kashyap). Post-nutritional education resulted in a significant increase in quality and quantity of foods eaten with a reduction in anemia prevalence (Garg & Kashyap).

Globally, 41.8% of pregnant women are considered to be anemic, with iron deficiency as the primary cause (WHO, 2012). Iron deficiency anemia can be a precursor for adverse birth outcomes, such as preterm birth, LBW, and postnatal mortality related to post-partum hemorrhage (Allen, 2000; Villar, Merialdi,Gulmezoglu, Abalos, Carroli, Kulier, & de Oni., 2003). A systematic review on the use of iron and folic acid supplementation in pregnant women in developing countries concluded that prenatal and postnatal supplementation was an effective treatment for severe anemia (Villar et al.). Vitamin A and zinc deficiencies are also prevalent in developing countries contributing to increased risk of perinatal sepsis due to impairment of the mother's physiological response to infections (Villar et al.). In a study of Nepalese women receiving vitamin A prenatal supplementation, a reduction in overall maternal mortality was noted (Villar et al.). Other adverse fetal outcomes attributable to micronutrient deficiencies include spina bifida and neural tube defects, as well as poor fetal and infant skeletal growth

(Allen, 2005).

Malnutrition is a leading cause of maternal and fetal complications in developing countries. Food insecurity in developing countries is the predominant cause of malnutrition; however, traditions and cultural beliefs surrounding nutrition during pregnancy can impact the nutritional status and outcomes. It is an important aspect of global health care to acknowledge cultural beliefs and traditions as part of efforts to improve maternal and child outcomes.

Cultural safety in global health care is imperative when providing care and prenatal services to any community. The concept of cultural safety was developed as a means to better care for the indigenous people of New Zealand, the Maori, who as patients and nursing staff, suffered as a result of the current health care system (Papps & Ramsden, 1996). This resulted in a profound restructuring of nursing knowledge in how to care for the individuality of patients. Guidelines were developed to help nursing students learn to care for patients as a whole, incorporating their values and beliefs and teaching them how to recognize that there are other ways to experience life and view the world and it is important to acknowledge the differences (Papps & Ramsden)

Ramsden (1992) explains that cultural safety is the progression from cultural awareness to cultural competence and finally cultural safety. An initial understanding of the culture, the values, and beliefs of the patient is necessary to achieve culturally safe care. The principles of cultural safety focus on improving health status in patients with different cultural backgrounds, enhancing the delivery of health care through culturally safe nursing practice, recognizing the many layers of diversity in human behavior and social structure, understanding the impact of the nurses own culture, history and attitudes, and to be able to recognize potential power imbalances in the nurse/patient relationship (Nursing Council of New Zealand, 2011). Brascoupe and Waters (2009) suggest that the challenge is in broadening the understanding of cultural competence in

health care practice to the concept of cultural safety. In acknowledging that health and illness are socially determined, as a health care professional, it is important to understand the "involvement of individuals, families, and communities; a link between knowledge and caring; and the recognition that culture contributes to the shaping of health behaviors and health outcomes" (Brascoupe & Waters, 2009, p. 9).

Hole et al. (2015) interviewed Aboriginal peoples in Canada and reported their experiences with cultural safety in the health care setting. The participants placed "being visible" as a high priority, which meant seeing them as aboriginal, being herd and respected throughout the care process (Hole et al.). They were receptive to being seen as equal, without the presence of a power imbalance in the nurse/patient relationship (Hole et al.). The participants also shared unsafe cultural care experiences, which included past experiences of community members which associated a bad connotation with colonial health care, such as experiences with racism, insufficient resources, and current rules or policies which did not reflect Aboriginal cultural practices (Hole et al.). Cultural safety is diverse in every health care setting, just as it is tailored to each individual patient in regards to their own unique needs, values, and traditions.

In the Maasai, culturally safe PNC is not only about being knowledgeable of their values and traditions surrounding pregnancy, but acknowledging these beliefs and working with Maasai women and community members towards a common goal of healthier pregnancy outcomes.

2.2 Maternal and Newborn Health and Nutrition: Indigenous

A number of studies considered Indigenous practices related to prenatal mothers highlighting both the diversities and commonalities in such practices. As stated by Wulandari and Whelan (2010), there is a wide range of 'should and should not be eaten' lists for pregnancy which are Indigenous-informed. For example, food avoidance during pregnancy was studied by Shannon & Mahmud (2008) with 63% of their Bangladeshi participants reporting stoppage of

consumption of fish and meat, as well as other staples such as eggs, rice, and dhal. Similarly, in a study conducted in southern Tanzania, 69% of the women reported avoidance of fish and farm meats (Marchant, Armstrong-Schellenberg, Edgar, Ronsmans, Nathan, Abdulla, et al., 2002). About a quarter of Indonesian pregnant women in the study by Hartini, Padmawati, Linholm, Surjono, and Winkvist (2005) reported discontinuation of fish, meat, and eggs throughout pregnancy. Meat restriction was also a part of the cultural practice in Indonesia (Tapiero et al., 2001)

Some authors spoke of dietary preferences or additions at different points of the pregnancy, such as hot/cold foods (Shannon & Mahmud, 2008) and herbal remedies (Wulandari & Whelan, 2010). Of note, many of the Indigenous prenatal food restrictions were cited as being related to ensuring that the 'baby will not be too big' or to reduce the likelihood of 'a difficult labour' (Egwuatu, 1986; Shannon & Mahmud, 2008). Others indicated that certain foods would make the baby's head too large (Egwuatu, 1986; Bouchier, 1984).

It was found that dietary taboos were most often enforced by the elders (Shannon & Mahmud, 2008; Oni & Tukur, 2012); mother-in-laws (Shannon & Mahmud, 2008); or husbands and other family members (Oni & Tukur, 2012). Oni and Tukur also found that adherence to these cultural practices tended to be more consistent in youth (teenage) pregnancies and less educated women, as well as in women with a low body mass index (a finding mirrored by Yassin, Sobhy, and Ebrahim, 2004).

When the information from PNC caregivers differed from Indigenous practices, most women choose to follow cultural practices (Shannon & Mahmud, 2008). In a study by Wulandari and Whelan (2010), prenatal women in Bali revealed their covertness regarding the use of traditional practices to the health care practitioners. However, these findings were in contrast to a study in Zanzibar, Tanzania where women reported a fear of traditional medicine during

pregnancy (Young & Ali, 2005).

2.3 Maternal and Newborn Health and Nutrition: Tanzania

Food insecurity remains the primary cause of under-nutrition and under-nutrition related illnesses in Tanzania. The Tanzanian Household Budget Survey (2011/2012) revealed that 28.2% of the population in Tanzanian fell below the basic needs poverty line, which is an indicator of the minimum consumptions of goods necessary for long-term physical wellbeing (National Bureau of Statistics [NBS], 2013). Of the population that fell below the basic needs line, 9.7% also fell below the food poverty line, classified as extremely poor and unable to meet the basic food needs of a household (NBS, 2013).

Despite a 6.6% growth in gross domestic product from 1998-2007, there has been little change or reduction in Tanzania's poverty rates or household nutrition profiles (Pauw & Thurlow, 2010). The World Bank (2009; 2013) estimated, based on Tanzanian household surveys, that the percentage of people who had insufficient food availability decreased only slightly from 25.0 to 23.5% from 2000-2007, whereas infant mortality decreased by nearly 50% over the decade from 2000-2010. In Tanzania, Alderman et al. (2005) found that other determinants, such as season of birth can impact a child's nutritional status. During the rainy season, with an increase in labour demands and a decrease in food availability, the likelihood of delivering LBW babies increases and can negatively impact the nutritional status of these infants up until two years of age (Alderman et al., 2005).

Maternal weight prior to conception is a key determinant of fetal development and under-nutrition and can negatively impact infant birth weight (Ministry of Health and Social Welfare (MoHSW), 2008). In Tanzania, 10% of women of reproductive age (15-49 years) have a body mass index (BMI) of less than 18.5kg/m^2, classifying them as below normal (MoHSW, 2008). As an index of weight-for-height, BMI is commonly used to classify adults as underweight,

overweight, and obese. It is defined as the weight in kilograms divided by the square of the height in meters (kg/m^2) (WHO, 2006). Women with a below normal BMI are more likely to reside in rural areas as opposed to urban areas of Tanzania (MoHSW, 2008).

A study by Kalinjuma, Mafuru, Nyoni, and Modaha (2013) assessed nutritional status of women using BMI, workload of women, birth weight, and current breastfeeding practices in four regions of Tanzania (i.e., Dodoma, Iringa, Njombe, & Singida). Based on the BMI assessments of the women who participated in the study (Table 1), 12% were underweight, 65% were of normal weight, 16.64% were overweight, and 6.33% were of obese weight. All women participants reported being responsible for cooking, washing clothes, and fetching water, with 60% indicating roles in care of children, taking care of invalids in the household, and collecting firewood (Kalinjuma et al., 2013). The average birth weight for all regions was 3.24 kg, with 20% of births classified as LBW (Kalinjuma et al., 2013)

As previously stated, maternal weight prior to conception is a major determinant of LBW in infants, with maternal undernourishment during fetal development increasing the risk for developing macronutrient and micronutrient deficiencies during childhood (NBS, 2011). The Tanzanian National Food and Nutrition Policy focuses on four major nutritional deficiencies affecting the population of Tanzania which include; protein energy malnutrition, nutritional anemia, iodine deficiency disorders (IDD), and vitamin A deficiencies (National Bureau of Statistics (NBS), 2011). The 2010 Tanzania Demographic and Health Survey (TDHS) showed 25% of children under age five were stunted and 17% of these were classified as severely stunted (NBS, 2011). The TDHS revealed that 12% of children under age five are underweight (too thin for age) and 4% are wasted (too thin for height) (NBS, 2011).

Table 1. Body Mass Index Table

• Classification	• BMI(kg/m^2)	
	• Principal cut-off points	• Additional cut-off points
• Underweight	• <18.50	• <18.50
• Severe thinness	• <16.00	• <16.00
• Moderate thinness	• 16.00 - 16.99	• 16.00 - 16.99
• Mild thinness	• 17.00 - 18.49	• 17.00 - 18.49
• Normal range	• 18.50 - 24.99	• 18.50 - 22.99
		• 23.00 - 24.99
• Overweight	• ≥25.00	• ≥25.00
• Pre-obese	• 25.00 - 29.99	• 25.00 - 27.49
		• 27.50 - 29.99
• Obese	• ≥30.00	• ≥30.00
• Obese class I	• 30.00 - 34.99	• 30.00 - 32.49
		• 32.50 - 34.99
• Obese class II	• 35.00 - 39.99	• 35.00 - 37.49
		• 37.50 - 39.99
• Obese class III	• ≥40.00	• ≥40.00

Adapted from the WHO (2006). http://apps.who.int/bmi/index.jsp?introPage=intro_3.html

Mamiro, Kosteren, Roberfroid, Tatala, Opsomer, & Van Camp (2005) studied feeding practices contributing to wasting, stunting, and iron deficiency anemia among infants in rural Tanzania. In their study, through a 24-hour dietary assessment, it was concluded that complementary foods given to breastfeeding infants acted as a precursor for stunting, wasting, and iron deficiency anemia. Carbohydrates (69%) were evident as the most consumed macronutrient, followed by fats (18.6%), and, lastly, proteins (12.2%). In children ages 6-8, 9-12, and 13-23 months, complementary foods supplied 15%, 20%, and 27% of recommended iron

intake respectively. Approximately two-thirds of children were moderately anemic and 11% presented as severely anemic. Of the children studied, 35% displayed signs of stunting and 1.3% wasting (Mamiro et al., 2005).

Micronutrient deficiencies are prevalent in Tanzania, particularly iron deficiency anemia and iodine deficiencies (Leach & Kilama, 2009). Due to the increased needs for iron and folic acid during pregnancy, Tanzanian women are highly vulnerable to developing anemia during pregnancy which can negatively impact both mother and fetus (MoHSW, 2008). According to the TDHS, 40% of women aged 15-49 were classified as anemic, a slight decrease from 48% in the 2004/2005 survey (MoHSW, 2008; NBS, 2011).

Although food security in Tanzania is inadequate and with a large percentage of the population falling below the poverty line, food security is not the only determinant of maternal and child health. The lack of prenatal education on nutrition and health during pregnancy, as well as accessibility to hospitals and clinics are other barriers to healthy maternal and child outcomes. Mosha and Philemon (2010) reported factors influencing pregnancy outcomes in women living in the Morogoro District of Tanzania, and found 93% of the 157 women involved in the study began prenatal visits at the clinic in the middle of their second trimester with only 7% of women attending in the first trimester. With respect to proper pregnancy nutrition, 63.7% of the women studied knew the right types of foods to eat during pregnancy, with nearly one-third classifying fruits and vegetables as important to enhance their iron status (Mosha & Philemon, 2010). Additionally 63.7% of the participants listed meat, beans, lentils, and whole cereals as important foods to improve their general health (Mosha & Philemon, 2010). A minority (3.2%) of women were unaware of the role of diet and nutrition throughout their pregnancy (Mosha & Philemon, 2010).

An assessment of PNC services in Tanzania found the majority (69%) of Tanzanian

mothers will attend at least one PNC visit throughout their pregnancy (Lincetto, Mothebesoane-Anoh, Gomez, & Munjana, 2006.). However, to achieve adequate understanding of care management and full life saving potential that PNC visits provide, it is recommended to attend at least four visits (Lincetto et al., 2006). Tanzanian women view birth as a natural way of life and rely heavily on traditional birth attendants (TBAs), therefore, PNC by health professionals is often seen as unnecessary. The lack of communication between health professionals and TBAs was seen as a barrier to formal care during pregnancy (Lincetto et al.). A lack of education and awareness exist on potential danger signs during pregnancy as well as knowledge gaps related to optimal health and nutrition practices. Through community engagement and implementation of PNC services, mitigation of pre-existing conditions, prevention of pregnancy complications, and reductions of the effects of unhealthy lifestyles become possible (Lincetto et al.).

2.4 Maternal and Newborn Health and Nutrition: Maasai

Lawson, Mulder, Ghiselli, Mgadaya, Ngowi, Mfinanga, Hartwig, & James (2014) compared determinants of child health (i.e., food security, disease incidence, and vaccination rate) in Maasai children with neighboring tribes/ethnic groups. Determinants of child health included food security, diet, breastfeeding, incidence of disease, and vaccinations. When compared with other groups, Maasai children presented a lower dietary intake of fruits, vegetables, and staple carbohydrates, leaving them at a disadvantage in terms of nutritional status. Breastfeeding was highest in the Maasai community and carried out until two years of age, while vaccination coverage was lowest in Maasai children, with minimal reporting regarding malaria and worm infections (Lawson et al., 2014).

Sikar and Hodgson (2005) studied barriers to accessing adequate health care for pastoralist women and children in Tanzania. Barriers discussed by Maasai women included limited mother-child health clinics, no income to pay clinic or medication fees when necessary,

and prohibitive travel distances to clinics (Sikar & Hodgson). For those living in the NCAA, travel on foot to the nearest clinic puts them at risk of being attacked by wild animals and potential heat exhaustion, further reducing access to PNC.

There is a lack of literature surrounding maternal and child health in the Maasai community, specifically in the NCAA. As mentioned previously, Maasai rely heavily on relief food comprised primarily of grains and beans, which potentially limits food variation and specific micronutrients in their diets. Health care is primarily based on traditional practices and beliefs that can potentially compromise adequate PNC and child services. This discussion relates to the earlier consideration of Indigenous practices related to maternal nutrition.

2.4.1 Factors influencing nutritional status of the Maasai in pregnancy.

A dietary survey conducted during a drought season in a Maasai community in the Ngong Division, Kajiado District, Kenya, reported nearly half of the households in the survey depended on their own food source, 45.7% of the households purchased food, and the remaining 3% relied solely on food distributed by aid programs (Oiye,et al., 2006). A similar study focusing on the Maasai living in Kenya reported very little consumption of green leafy vegetables (5%) and meat (4%) by expectant mothers (Mpoke, Johnson, & Anderson, 1993). Brady et al. (2008) suggested an increased prevalence of vitamin A deficiencies occurs during dry seasons and severe droughts when food availability is decreased. The Maasai, historically, have been less susceptible to vitamin A deficiencies as compared to other Tanzanians due to their high consumption of cows' milk (Brady et al., 2008).

During pregnancy, the Maasai women tend to eat a modified diet, based on advice by TBAs. These modifications include eating a restricted diet after the sixth month of pregnancy to facilitate an easier delivery and a healthier baby (Brady et al., 2008). During a Maasai woman's

first pregnancy, diet restrictions may begin earlier than the sixth month (Mpoke et al., 1993). The diet during this stage of pregnancy excludes rich foods, such as fatty meats or milk, and vomiting is often induced with the use of bitter roots and herbs as a way of purifying the mother's blood stream to keep the baby healthy (Mpoke et al., 1993). In addition to calorie restrictions, pregnant Maasai women perform labour tasks, such as cattle herding, in order to increase physical effort and reduce their access to food (Mpoke et al., 1993). Immediately following delivery, postnatal and lactating women are given liquefied fat for cleansing, a concentrated solution of water and sugar for energy, along with fresh blood and milk, porridge with blood added, and soups with a variety of herbs (Oiye et al., 2006).

Martin et al. (2014a) studied the dietary intake and associated factors among Maasai women living in NCAA, as well as their rationale for limiting food intake during pregnancy. The study included 107 women of reproductive age whose diets were reported to be low in carbohydrates, proteins, and fats when compared to RDIs. Meals consumed by the women lacked variety and consisted mainly of maize with limited access to foods rich in protein and other nutrients. On average, the women consumed only two meals per day, based on traditional practices and status (Martin et al., 2014b)

2.4.2 Perceptions of Maasai women in regards to their nutrition in pregnancy

Powell (2012) interviewed Maasai women residing in the NCAA on their perceptions of the dietary restrictions during the third trimester of pregnancy. The interviews concluded that women viewed the restrictions as necessary for a safe delivery, as indicated by one mother *"when baby is coming, it is hard for mama. We try to make an easier birth by keeping the baby small."* (Powell, 2012 p. 28). Another rationale behind dietary restrictions included keeping their bodies "clean" during pregnancy in order to readily absorb nutrients contained in the postnatal

diet (Powell, 2012). Mawani's (1997) study on the perceptions of diet during pregnancy and how these relate to healthy baby outcomes on pregnant Maasai women residing in Kenya. Mawani found that the women believed it is important to continue a regular diet; however, certain foods such as sugar, certain herbs, sheep meat/intestines, and meat or milk of sick animals are avoided because they are perceived to have negative effects on the fetus.

There is minimal evidence on how Maasai women perceive the importance of diet and nutrition during pregnancy and on how it relates to healthy child outcomes. The inability to cultivate land within the NCAA places this particular community at a greater risk of food insecurity. This research explores traditional dietary practices of Maasai women during pregnancy and their perception on how diet and nutrition impact maternal and child outcomes. The results provide a better understanding of the nutritional status of pregnant Maasai women and may inform future research on some of the challenges for this community.

CHAPTER THREE

Methodology and Methods

Research Purpose and Questions

This cross-sectional study explored the daily dietary habits of select pregnant Maasai women living in the NCAA. This study was done using interpretive description methodology to answer two questions:

1) How do pregnant Maasai women from the NCAA describe their current dietary pattern?

2) What are the beliefs of pregnant Maasai women on the roles of nutrition in healthy pregnancy outcomes?

3.1 Setting and Sample

This study took place in the NCAA in Tanzania, Africa. The women recruited are from the Meshili village in Olbalbal District within the NCAA and in the city of Arusha. This site was chosen based on ease and availability for the student researcher to access the target population. The recruitment was in partnership with the Mama Kwanza clinics, which offer care services for prenatal and postnatal Maasai women, as well as other acute care services. The clinics are funded by the Canadian Department of Foreign Affairs Trade and Development (DFATD) and work closely with community leaders such as the ward administrator and the pastoralist committee on matters related to the running of the Mama Kwanza clinics.

To be eligible to participate, women must have self-identified as Maasai, currently in any trimester of their pregnancy, have the ability to understand how to interpret and complete the 24-hour diet recall (Appendix E), and have the ability to provide informed voluntary consent.

A convenience sampling approach was used to obtain 12 study participants. This sample was obtained from within the group of participants closest at hand, willing to participate, and who fit the set out criteria (Thorne, 2008). Ten women were recruited in Olbalbal. In consultation with the Mama Kwanza clinic and the Olbalbal ward administration, informational posters were displayed at the clinic. As the posters were written in Swahili and some women only speak Maa or are illiterate, the research assistant explained the poster to the women attending the clinic. The research assistant also entered the community to inform and invite known participants who met the criteria. The remaining two participants were recruited in the city of Arusha through a local Maa physician who knew the participants and explained the research process, intents, and risks and in turn, referred them to the student researcher.

Verbal and written consent for all interviews was obtained from each participant and digitally recorded. Due to the time constraints and issues, such as travel distances and access, recruited participants were interviewed and diet recalls were done at the same time. The research assistant explained project intents, commitments, risks and benefits to eligible women within the NCAA willing to participate in the study. The women were invited to participate in an interview conducted by the research assistant, with most interviews lasting between 15-20 minutes in duration. The student researcher conducted the two interviews in Arusha, with the help of a translator. These interviews ranged from 45-60 minutes in length. It is noted that the women living in the city tended to have a higher education level which may have resulted in more in depth answers to the questions asked. As well, these latter interviews were conducted by the student researcher which may have yielded more extensive probing. As in the case of the NCAA participants, the 24-hour diet recalls were done immediately after each interview.

As an honorarium, each participant received a 5000 Tanzanian Shilling (TSH) phone card, which is approximately $3.10 (Canadian). Women had the choice of participating in both

the interview and the 24-hour diet recall or only one component, and still received the honorarium, regardless of level of participation.

3.2 Methodology

Qualitative research is defined as any type of research which produces findings not derived from statistical analysis or quantitative means (Cypress, 2015). Using a naturalistic approach, qualitative research seeks to understand phenomena about persons' lives, stories, and behaviors as these relate to clinical practice (Cypress, 2015).

Interpretive description was selected as the qualitative methodological approach to distinguish commonalities between what was already known in relation to pregnant Maasai women and the findings of this study, allowing interpretation of new data and application of evidence to practice. This non-categorical research methodology encompasses multiple qualitative methods used to describe the complex interactions between psychosocial and biological phenomena (Thorne, Kirkham, & O'Flynn-Magee, 2004). Thorne et al. (2004) believed that, rather than enforcing rules of strict methodologies or having to choose only one way of interpreting data, it is necessary to develop an approach which encompasses multiple views, providing a grounding for the linkages between subjective experiences and clinical practice.

Thorne (2008) expressed the need for a qualitative approach which was easily transferable from theory to clinical practice. In developing this methodology, Thorne emphasized the individuality of patients and how the communication between practitioner and patient can help to generate patterns and themes within people's stories leading to better informed care for the individual. It is further explained that as a discipline, nursing is advanced through dialect which emphasizes that the care of an individual patient is centered on the understanding and examining of the relationship between subjective and objective information (Thorne). The need

for an applied qualitative research approach is the foundation of interpretive description to "generate better understanding of complex experiential clinical phenomena within nursing and other professional disciplines concerned with applied health knowledge or questions from the field"(Thorne, p. 27).

Interpretive description is closely related to phenomenological approaches in its choice of methods for data collection (such as interviews, focus groups) which are also derived from grounded theory, naturalistic inquiry, and ethnography (Thorne et al., 2004; Thorne, Kirkham, & MacDonald-Emes, 1997). The interpretive description methodology provided a framework for this inquiry, as well as rationale for anticipated boundaries, theoretical assumptions, biases, and preconceptions that drive design decisions (Thorne et al., 1997).

3.2.1 Data collection.

The data collection methods used in this study involved two optional parts for participants: 1) a semi-structured individual interview; and 2) a 24-hour diet recall. Each woman was invited to complete both parts of the data collection, but could choose to participate in either or both. All participants chose to complete both parts in this study.

3.2.2 Interviews.

Interviewing is commonly used in interpretive description as a data capture method to "capitalize on human commonalities as well as individual expressions of variance within a shared focus of interest" (Thorne, 2008, p. 74). The intent of this research project was to immerse myself within the culture of the Maasai, to understand their unique ways of living, and to collect all data myself, with the help of a local translator. Due to unforeseen circumstances at the time of data collection (i.e., the last stages of a presidential election) I was unable to obtain the necessary government permits to enter the Ngorongoro Conservation Area Authority (NCAA) and to perform the interviews in person. As a result, the research assistant performed

the interviews and diet recalls for the ten Maasai women who resided within the NCAA. The research assistant, who is male and Maasai, was also a clinic employee at the Mama Kwanza clinic in Olbalbal. Another alternative considered (rather than having the research assistant conduct the interviews) was to engage the local female physician who works at the Mama Kwanza clinic; however, she did not speak Maa nor was she of Maasai descent. It was felt, by the student researcher and supervisor, that the research assistant's background was appropriate and acceptable as he grew up in the community, exhibited personal trusting relationships with the members of the community, including the women who attend the clinic as he has served as the translator at that site (as a trilingual speaker in Swahili, Maa, and English). Additionally, he has worked with the supervisor and other faculty members in the past in this capacity and is known to be able to follow research principles and guidelines. Prior to the Olbalbal interviews, the student researcher explained the purpose and guidelines of the interviews, introduced and reviewed the interview guides, and instructed the research assistant on the appropriate interview techniques to use, while conducting each interview (Appendix D). He also was instructed on obtaining specific demographic elements (Appendix C) at the time of the interviews.

The ten individual interviews performed in Olbalbal by the research assistant were digitally recorded. The research assistant, who was experienced in previous research involvements, conducted the interviews in Maa. Throughout the transcription process, the research assistant replayed the digital recordings and translated them from Maa to English in the presence of the student researcher. This co-presence allowed the student research to transcribe, as well as seek clarification of the meanings of certain words and phrases in order to ensure authenticity of each interview.

The two individual interviews conducted in Arusha were facilitated by the student researcher and the research assistant. These interviews were digitally recorded. At the end of

each interview the student researcher and translator/research assistant transcribed the interview together to clarify any necessary words or phrases.

3.2.3 24-hour diet recall.

The 24-hour diet recall (Appendix E) requested each woman to identify which type of foods were eaten, and at what time each day. For example, if one type of food was eaten more than once in a day, the woman was asked to state how many times each food was eaten.

3.3 Data Analysis

Thorne et al. (1997) advised researchers to keep data analysis simple and to avoid removing the researcher from the participants, which could harbor over analyzing and misinterpretation of the participants views. The use of analytical techniques, which emphasize a deeper knowledge of the data gathered prior to classifying, coding, or creating linkages, enabled the researcher to intimately know the individual cases, decipher relevant themes within the data, and produce knowledge that can easily be applied back to the individual cases (Thorne et al., 2004).

All interviews were analyzed using content analysis, a technique for creating replicable interpretations from qualitative data such as interviews, observations, and other materials to the context of their use (Krippendorf, 2013). The purpose of content analysis is to not only manage large amounts of text into themes and subthemes with similar meaning but to generate a deeper interpretation of the data through the classification of coding and identifying commonalities and themes within the findings (Hsieh & Shannon, 2005). The interviews were analyzed by highlighting or coding common words, phrases, and subjects then grouping them into three main themes: a) diet; b) difficult work/environment; and c) traditions. The diet and tradition themes were then subdivided further into: food insecurity, food restrictions, traditional practices, and community experience. The use of themes helped to establish relationships between common

words and phrases, which began to shift the understanding from the individual to the group as a whole. By transferring the participant's experience into words, whether verbally, written, or in thought, this content analysis strategy helped transform the actual experience of the participant into a written work.

3.4 Rigor

In qualitative research, in order to transfer research from paper to practice, researchers need to strengthen the credibility or trustworthiness of their findings. With the limited time available for data collection, the student researcher conducted community discussions with local physicians and clinic employees used to increase validity of the findings. Prior to data collection, the researcher spent 60-90 minutes engaging with community members, physicians, and clinic employees discussing Maasai traditions, nutrition during pregnancy, lived experiences, and observations relating to the research subject. The discussions occurred with a physician at a community clinic in Arusha, a Mama Kwanza clinic employee, and a Mama Kwanza clinic physician. The consultations facilitated the student researcher in interpreting and validating findings.

Reflexivity is used to strengthen the validity of research findings, which could be at risk due to biases or preconceptions established in the interviewer-interviewee relationships (Roller, 2012). The student researcher addressed any assumptions, preconceptions, or beliefs associated with the study participants by discussing biases, and preconceptions with the supervisor prior to and throughout the data collection and analysis portions. As a Canadian Registered Nurse (RN), the student researcher understood the risks associated with caloric restrictions during pregnancy; however, she did not fully understand the deeper cultural aspect surrounding the diet of Maasai women during pregnancy and their rationale for the restrictions. It was necessary to set aside these biases when engaging with Maasai women and listening to their stories. Thorne, Kirkham,

and Emes (1997) suggested the use of a reflective journal while collecting and analyzing data, in order to maintain the authenticity of the participants' views. A reflective journal was kept to document and reflect on all impressions and reactions to the interviews throughout the transcription process. When using translators, it was necessary for the student researcher to clarify assumptions or misconceptions throughout the translation/ transcription process. Phrases or words from participants could have been misrepresented without clarification of meanings by the research assistant such as the term "big baby", which in the Canadian context may refer to any birth weight greater than 4.5 kg, but the weight range in the Maasai community is 2-2.5 kg therefore "big baby" represents any birth weight above 2.5 kg. Other potential misconceptions arose when the women explained "cleaning out", or how they view the process of inducing vomiting and diarrhea as a healthy initiative in order to detoxify themselves. As a Canadian RN, this practice could be viewed as an unhealthy behavior, detrimental to the baby, and could be confusing to connect this behavior to the connotation of health. It was necessary to have the research assistant explain the traditional meaning and rationales for certain practices in order to look past and remove biases and misconceptions. Due to time constraints for the women who need to traverse long distances to get home, the research assistant was unable to review each interview with each participant to clarify findings. However, with the participants located in Arusha, highlights of the interviews were discussed with the participants through a translator immediately following the interviews in order to clarify their meanings.

3.5 Ethics for Human Subjects

This study was submitted for ethical review and approved by the University of Saskatchewan Behavioral Research Ethics Board (Beh 15-209). All data obtained from this study were kept temporarily on a secure locked personal computer of the student researcher until the student researcher was able to transfer all of the information to a University of Saskatchewan

secure system and locked office of Dr. Pammla Petrucka at the University of Saskatchewan. The data will remain on the secure system of Dr. Petrucka for a minimum of five years. All recorded electronic/digital data, participant information, and journals will also be destroyed and deleted from all hard drives after five years, as per confidentiality policies. Hard copies will be shredded according to the University of Saskatchewan policies in the same time period. Confidentiality of all participant information will be maintained. The student researcher will not share any personal information obtained with anyone outside of the research team that includes the student researcher, research assistant, and supervisor. All identifying data are stored separately from transcriptions, and results and reporting maintaining the privacy and confidentiality of the participants. All participants were chosen based on their willingness to participate in the study and eligibility to participate based on outlined criteria. Once participants agreed to the requirements of the study, they signed a consent form (developed by the translator for participants who did not speak English) in Swahili (Appendix B). For illiterate participants, consent to participate was explained to them in Maa or Swahili by the tri-lingual research assistant and verbal consent from the participants was accepted and captured by digital recording.

3.6 Relevance and Benefits

The purpose of this study was to gather information on the nutrition of pregnant Maasai women in Tanzania and how they perceive their dietary patterns affect their delivery and pregnancy outcomes. Many women in developing countries who experience socioeconomic deprivation are at an increased risk for perinatal and neonatal deaths, therefore improving the health of the mothers is directly linked to improved health of the fetus (Bhutta, et al., 2005). The information generated from this study may be used as a baseline for further research in this field. Awareness of the advantages and/or limitations of the dietary habits of the Maasai women in

producing healthy pregnancy outcomes can also help to determine appropriate interventions that will decrease complications during deliveries, as well as perinatal and neonatal deaths within this sub-population.

CHAPTER FOUR

Findings

4.1 Thematic Analysis

Twelve interviews and 24-hour diet recalls were conducted with pregnant Maasai women. Due to the unforeseen circumstances, preventing the student researcher from entering the NCAA, the research assistant was given an outline of the interview questions with instructions on how to perform the interviews and diet recalls. Of the participants, ten lived in the Meshili village in Olbalbal District within the NCAA, the remaining two (originally from NCAA) lived within the city of Arusha. The interviews and recalls were collected between November 13th and November 16th, 2015. Demographic data was obtained from all women prior to each interview (Appendix C). Ages of the women ranged from 18-30 years, including one primigravida with the remainder multigravida; all the women were married.

The majority (ten) of the interviews in the NCAA were performed in the homes of participants in order to reduce their walking distance. The student researcher conducted the remaining two interviews in the city of Arusha, at the international office of her supervisor, with the assistance of a translator. All discussions with the members of the professional and support team were conducted at the Mama Kwanza Clinic in Arusha in English (which is the working language of health professionals). In order to enhance authenticity and a respectful approach, direct quotations from the interviews were incorporated with minimal editing to capture their authentic voices.

Data collected during the interviews was analyzed using narrative analysis. Throughout data analysis five common themes were identified:

a) Eating less food lets baby come easier;

b) Not producing food means more dependence;

c) Working hard harms my baby;

d) Knowing what is needed for a good pregnancy;

e) Preferring our traditional ways for pregnancy and birth.

In the following sections, each theme is discussed further, including examples and representative quotations from individual women's voices.

4.1.1 Theme 1: Eating less food lets baby come easier

The majority of the women in this study live in the rural community of Olbalbal in the NCAA. They travel long distances to clinics and value the tradition of giving birth at home under the supervision of a traditional birth attendant (TBA). Delivering at home makes it necessary for women to avoid big babies, which they believe, is a deterrent for delivering at home and increases the risk for a cesarean delivery. A local physician at the Mama Kwanza clinic explained that the weight range of babies born at the clinic is 2-2.5kg, therefore for the sake of this study; a "big baby" was any weights more than 2.5kg. For example, one woman stated *"If I eat meat it will make the baby fat that would make me go to the hospital and deliver through surgery."*(Participant 9). Maasai traditions surrounding food during pregnancy restrict women from consuming unpasteurized milk, meat, or milk from cattle (other than their own), eggs, sweet foods, and butter. Traditions also prevent women from eating any meat or drinking milk from their sixth month of pregnancy until delivery. At delivery, they are expected to be "clean" in order to readily absorb nutrients contained in the postnatal diet.

> *Ice cream, candy, any sweet foods aren't allowed, I am not allowed to eat the fat separated from the milk (butter) until I am closer to birth. We believe that if we eat eggs during pregnancy, the child will be born without hair. We avoid those foods because we don't want the baby to get really really fat and they won't be able to*

help themselves during day to day activities cause they will be too big. (Participant 2).

Traditional beliefs require pregnant Maasai women to restrict caloric intake and prevent them from eating heavily sweet or fatty foods. When asked "What foods do you avoid while you are pregnant?" one women replied *"beans and milk, because if you eat this, the baby will be fat"* (Participant 6). In combination with the dietary restrictions, many pregnant Maasai women also reported a decrease in appetite during their pregnancy, with the added nausea and vomiting, this further restricted the women's dietary intake. All of the women interviewed reported feeling very tired since becoming pregnant. One woman said, *"Sometimes I wake up feeling very tired and nauseous…I feel drunk but haven't had anything to drink…when I feel that way I just drink water or anything sour"* (Participant 2). The increased nausea and fatigue prevents woman from being able to complete daily activities and eat their recommended daily allowance.

> *I sometimes have to add mud to our home and gather firewood. It is really hard to do those things when I am pregnant but I have to cause no one will help me. Also, the clinics are far away from where I live, on sunny days, I don't feel like walking long distances, cause it's too hot* (Participant 2).

In a Maasai household, the male head is always the first to eat followed by the children, and lastly, the mother. Most of the women interviewed reported being fed last as having no effect on how much food they received, however, one woman explained:

> *Since I've been pregnant and am told not to eat certain foods, they don't see me as a priority to have to eat first. Sometimes I'm not full but I'm supposed to stop eating cause I've reached my limit…and sometimes if we run out of food I have to drink tea with milk instead. There's nothing that I can do because it's the tradition*

(Participant 2).

The majority of the women interviewed reported using local herbs and medicine at some point throughout their pregnancy as a way to induce vomiting or diarrhea. Local medicine is used in Maasai culture during pregnancy to cure mothers from sickness or after they eat foods high in fat or sugar. Primarily, the mother-in-law or elders monitor the diet of the pregnant mother. One woman stated *"If she sees me eating foods that she believes are bad for baby, too fatty, or will make baby over weight she will make me drink a special medicine to induce vomiting"* (Participant 2). The special drink, which induces vomiting and diarrhea, is seen in the community as a way to cleanse the mothers from bad food or sickness. One woman said, *"[I] take these medicines to have an appetite to eat more…to feel light"* (Participant 11). Another woman, who was concerned about not eating enough, stated *"Women have to hide while eating when [we] are pregnant so the elders don't see [us] eating too much"* (Participant 2). On average, the Maasai women interviewed were given local medicine consisting of naturally grown herbs once a week to induce vomiting and diarrhea. Two Maasai women out of the twelve interviewed alternately lived in the city and Olbalbal. One of the two women discussed how Maasai cultures and traditions differ from when they live in the NCAA to when they live in the city.

> *I am a Maasai that lives in town so there's no one to restrict my diet, so sometimes I eat whatever I want but sometimes if I eat something that I don't think is healthy I'll take the medicine myself to make myself vomit* (Participant 1).

In Maasai tradition, it is viewed as necessary to reduce dietary intake during pregnancy to avoid big babies and complications during childbirth. Pregnant mothers rely on the experience of relatives and elders in the community to guide them through pregnancy and delivery without formal health system intervention.

4.1.2 Theme 2: Not producing food means more dependence

In the NCAA, the Maasai are unable to cultivate the land due to the *Ngorongoro Act of 1975.* As primarily cattle farmers, the Maasai historically relied on cattle, sheep, and goats as their principal dietary sources. Throughout the years, herd sizes have decreased leaving the Maasai to rely more heavily on food brought in to the NCAA on market days or relief food provided by the Tanzanian government. Market days are held on the third and sixteenth of every month in Olbalbal when vendors from bordering towns enter the NCAA to sell fruits and vegetables to the local communities. Women walk long distances to the village in order to purchase fruits and vegetables at the market. Due to limited funds and supply not all women who attend the market are able to purchase fruits or vegetables and are limited to what grows naturally in the surrounding forests. When asked, "Where do you get your food from?" six of the women reported purchasing maize, with seven of the women saying milk they get from their cows, one women reported *"Milk from our cows, maize we buy"* (Participant 7). Three of the woman interviewed reported getting vegetables from the forest, one stated, *"I get milk from the cow and vegetables growing naturally in the forest"* (Participant 10). Only one woman mentioned getting fruits or vegetables at the food market in the NCAA, and two of the women reported getting fruits and vegetables outside of the NCAA.

> *When I am in [the city] I get food from the market around town. When I am in Ngorongoro [I] give the bus driver money to go out of the Ngorongoro into Karatu to get vegetables and fruit from the market because I can't buy any in Ngorongoro* (Participant 2).

Very few Maasai families are able to purchase food outside of the NCAA due to lack of transportation and lack of funds, leaving them limited to milk, maize, and meat derived from cows, sheep, or goats. Once pregnant, women are further limited to where they receive their

meat. To avoid tainted or sick animals, they slaughter their own animals and are unable to eat any meat obtained from outside the family. Pregnant women will also avoid unpasteurized foods throughout their pregnancy to avoid sickness. When asked to explain Maasai traditions surrounding diet during pregnancy, one woman explained:

> *Mostly what [Maasai women] eat in Ngorongoro is maize, maize flour, milk, and meat/intestines. The goat meat is from our own heard of goat, we never take meat or livestock from anywhere else because we don't know if they were on any medication or sick. We know our meat is safe. They slaughter the goat and let the woman pick which part she wants to eat* (Participant 2).

In the NCAA, food availability is also affected by season, (rainy and dry seasons) altering which foods are naturally available as well as which foods are brought into the NCAA for purchase. In the past, droughts in the NCAA have affected livestock numbers, diminishing the available livestock for slaughter as well as milk and milk products. During the rainy season, an increased number of women reported eating vegetables, with seven of the twelve women interviewed having eaten vegetables in the rainy season along with milk and meat. One woman stated *"during rainy season [I eat] milk, ugali (maize flour meal), vegetables [and] during the dry season, we [eat] porridge, ugali, and beans sometimes"* (Participant 12), and another woman replied, *"During the rainy season I get vegetables and ugali (stiff porridge), and during the dry season I get only porridge"* (Participant 8). Only three of the woman interviewed reported eating any form of protein or dairy product during the dry season, with the majority reporting eating only maize, and maize porridge.

When asked, "What types of foods do you eat most days" the majority of the women stated *"maize"* (Participant 9) and *"porridge made from maize"* (Participant 10). Three out of twelve women reported drinking milk or milk products most days, four out of twelve reported

eating meat or meat products, and only one woman reported eating fruits and vegetable. Without the ability to cultivate their own land, the Maasai have very limited food variability.

4.1.3 Theme 3: Working hard harms my baby

Throughout the interviews, it became apparent that the women in the community were responsible for most of the household chores such as collecting firewood and water, taking care of children, and making meals for the family. Half of the women interviewed described difficult environments and increased workload as being detrimental to a healthy pregnancy. Pregnant Maasia women will steadily increase their workload throughout the second and third trimesters in order to prepare for the postnatal period, when they remain in their bomas for three months post-partum to recover from childbirth and to care for their newborns (Powell, 2012). When asked "What makes it hard to have a healthy pregnancy/healthy child" one woman answered, *"…doing difficult work during my pregnancy"* (Participant 11), and when asked "What is good for you during pregnancy and what is bad" the same woman replied *"good, by avoiding difficult work and bad, by working while pregnant"* (Participant 11). Many of the women described feeling hungry, tired, and weak throughout their pregnancy. The increased workload and decreased nutritional support makes it hard for women to maintain the energy level necessary to perform activities of daily living. When asked, "What makes the baby healthy during your pregnancy?" one woman answered, *"by avoiding difficult work"* (Participant 4) and she affirmed she did so during her own pregnancy. Only one woman reported purposely avoiding difficult work during pregnancy; however, when asked, half of the women knew that by avoiding difficult work during pregnancy they could increase the chance of a healthy pregnancy. One woman explained that walking long distances while pregnant became increasingly difficult saying, *"they don't care if I'm pregnant or not I still have to do my daily chores like, walking to get water and firewood which usually involves long distances"*(Participant 2). When asked what was good

during pregnancy and what was bad she then added, *"I sometimes have to add mud to our homes, and gather firewood. It is really hard to do those things when I'm pregnant but I have to do them cause no one will help me"* (Participant 2). Daily chores become increasingly difficult to perform in the heat and many of these women have little protection from the heat. Some of the women interviewed chose to sacrifice clinic visits and checkups in order to avoid walking long distances, with one woman explaining *"the clinics are far away from where I live, on sunny days I don't feel like walking long distances cause it's too hot, so I prefer to stay home"* (Participant 2). The majority of the women interviewed had a general understanding that performing difficult chores during pregnancy can cause weakness, dizziness, and is detrimental to the growing baby. However, Maasai traditions outweigh individual wants and needs making it increasingly difficult to listen to the body's needs during pregnancy. Many women are expected to stay hungry, avoid rest, and continue to work until they feel too tired or weak to continue. When asked, "How have you been feeling so far in your pregnancy?" all of the women reported feeling tired with one woman explaining *"Some days I don't want to get out of bed at all, I just get out of bed cause I have stuff to do but if I had a choice I would stay in bed"* (Participant 1). Although all of the women reported feeling weak and tired throughout their pregnancy; the majority of the women when asked how they are feeling so far throughout their pregnancy replied *"I'm doing fine with my pregnancy"* (Participant 5). Only two women reported concerns, one stating,

> *What I am going through I don't feel anything good at the moment, the only thing good about the pregnancy is about having the baby. It is a really hard time, the conditions I go through with my body [are] hard for me. The only thing I look forward to in the pregnancy is the baby* (Participant 2).

When asked how she was feeling she then replied *"I'm feeling 20 percent of my normal"* (Participant 2).

All of the Maasai women interviewed described performing difficult work or daily chores as fatiguing, difficult, and harmful during pregnancy. However, many women continue to do so due to necessity and cultural practices.

4.1.4 Theme 4: Knowing what is needed for a good pregnancy

Mothers have a natural capacity to maintain the health of their children during pregnancy. Many of the Maasai mothers showed instinctual knowledge on how to maintain a healthy pregnancy, even though it may have contradicted what is believed in their culture. Cultural beliefs and traditions surrounding pregnancy enforce certain rules or guidelines on mothers involving diet, activity level, and rest. Many of the women interviewed understood that not all of these traditions are beneficial. When asked, "What do you think helps make the baby healthy while you are pregnant?" five of the women reported getting milk was important, while three also reported some form of protein was important. Three women reported fruits and vegetables as beneficial during pregnancy, with one woman stating *"by eating what you are interesting in while you are pregnant"* (Participant 11). Only two of the twelve women said they did not know what helps make baby healthy during pregnancy. Most of the women had a basic understanding of good nutrition during pregnancy and when asked if they followed this during their own pregnancy, eight of the women said yes, one woman said she tries to do so when she is able to, and one woman said she did so prior to her fifth month of pregnancy. When the women were asked about local medicines and herbs, some phrases they used to describe their uses were: "*to clean out", "to help cooling down our bodies",* and *"for fever"*. Many of the women were vague on whether they viewed local medicine as good or bad, they only described it as necessary during pregnancy to ensure health and to void them of over indulgences. When asked, "What makes it hard to have a healthy pregnancy/healthy child?", ten out of the twelve women answered the question with seven mentioning hunger, lack of food or lack of health as

detrimental factors to having a healthy pregnancy, and four mentioning difficult work or environment as factors.

The women were then asked to distinguish what was good and bad during their pregnancy. Six of the twelve women mentioned hunger and lack of food as being bad during pregnancy. One woman said, *"Good [is] getting food, and bad [is] lack of food."* (Participant 3), another woman reiterated *"Good, if I get enough food, and bad, if I am hungry"* (Participant 5). The other half of the women mentioned not enough rest, and difficult work as being bad during pregnancy. One woman said, *"Good [is] avoiding difficult work, and bad [is] working while pregnant" (*Participant 11). Some Maasai women also mentioned anger as being harmful during pregnancy. One woman stated,

> *I wish I could change how much anger I have, cause in Maasai traditions you are not supposed to be an angry person during pregnancy cause I don't think it is healthy for my baby to be mad all the time. There is nothing that I can do about it, I don't want to be angry all the time it's just the way it is* (Participant 1).

The women in this community view hunger, lack of rest, lack of energy, and difficult work as being harmful to their pregnancies. However, due to their cultural beliefs and surroundings, many do not have the means or support to adapt these healthy practices. A woman expressed concern over a change in her appetite by saying, *"I don't eat as much as I used to, I think my loss of appetite led to me losing weight, if there was a medicine for me to [take] to increase my appetite I would take it, but I don't know"*(Participant 1).

When discussing what was good to do during pregnancy, six of the women mentioned getting food or having a healthy balanced diet as good *"Good [is] by having a balanced diet"* (Participant 8). One woman mentioned rest as being good saying *"Good [is] having enough*

time for resting" (Participant 10).

Lastly, the women were asked if there was anything that they could or should change to help the baby grow during pregnancy. Three women voiced *"having resting time"* (Participant 6) as something they could change to help baby grow. Three women said having a balanced diet was important, with one woman adding *"to try to find balanced diet which my baby loves"* (Participant 11). One woman said it was important to *"stop being angry"* (Participant 1). One said it was important to help baby grow *"to get what I want to have"* (Participant 9). Three of the women replied, *"I don't know."* One of the women interviewed lives in the city as well as the NCAA, and was able to give different views on Maasai cultural practices during pregnancy. When asked what she could change to help baby grow during pregnancy she said:

> *There's lots of things, like when I go to the clinic I get information on what types of food I should eat that are good for the baby, things like eggs and foods that I am restricted to eat. I get information from the clinic that they are good to eat but our traditions restrict me from eating them. These things I would like to change. [Also] attending the clinic more so I know how the baby is doing and help the baby get proper health…I don't think that we have to be slaves working and doing everything like fetching water, and carrying firewood. I think pregnant women should only do what they can do [and] not be forced to do things that we cannot do* (Participant 2).

She further explained that many Maasai women seek information from family members, community members, and community elders during pregnancy. She demonstrated knowledge of the importance of proper nutrition during pregnancy, as well as exercise and rest. Through any life event, people seek the guidance from others who have experience in the area, trusted members of the community, and health care professionals. In Maasai culture they rely on TBAs,

relatives, and elders to guide them towards a healthy pregnancy and birth.

4.1.5 Theme 5: Preferring our traditional ways for pregnancy and birth

Maasai cultures and traditions are passed on through generations, which is evident for prenatal and postnatal care. When asked what people help them during their pregnancy, all of the women answered *"family"* which included mothers-in-laws, husbands, parents, and some of the other wives of their husbands. One woman stated, *"For us we get help from women elders who have already gave birth and are years older…I need to be close to someone that has experience in the community"* (Participant 2). Elders are used for their experience in the community, especially surrounding pregnancy. Elders are partially responsible for monitoring food intake, and administering local medicine for nausea, fever, or to induce vomiting and diarrhea. Women in the community are also responsible for cooking meals for their families, leaving them to eat last. One woman explains:

> *Since I've been pregnant, and I am told not to eat certain foods, they don't see me as a priority to have to eat first. Sometimes I am not full but I'm supposed to stop eating cause I've reached my limit of how much I should eat during a meal* (Participant 2).

Family members, community members, and elders are all responsible for monitoring food intake during pregnancy. With constant supervision it becomes difficult for women to maintain a healthy diet. One woman reported:

> *The mother in law monitors my diet, if she sees me eating foods that she believes are bad for baby, too fatty, or will make baby over weight, she will make me drink a special drink to induce vomiting…given on average once a week…women have to hide while eating when they are pregnant so the elders don't see them eating so much* (Participant 2).

She then followed up with, *"don't eat much in Ngorongoro because elders want to restrict intake to have smaller babies and a natural birth, big babies equal surgery"* (Participant 2). All of the women interviewed reported receiving help and information throughout their pregnancy by experienced relatives. Only one woman reported seeking help through clinic nursing staff, and one woman reported seeking medical advice from the "Wakunga", who is a Traditional Birth Attendant, responsible to help during birth. One woman explained the role of the Wakunga by saying:

> *If I get to the point when I feel really really bad they call Wakunga…[they] examine me and tell me if the baby is in a bad position and try and figure out the problem, or they will tell me how to properly rest my body* (Participant 2).

One woman reported barriers to seeking medical advice from health professionals saying, *"the clinics are far away from where I live, on sunny days I don't feel like walking long distances…I prefer to stay home"*(Participant 2). Environmental conditions such as distance and seasonal weather (i.e., rains) also play a role in deterring women from seeking medical advice throughout their pregnancies.

Elders are also responsible for administering local medicine to women who experience nausea, fever, or who need to be "clean". Nine out of the twelve women reported taking some form of local medicine throughout their pregnancy. One woman reported, *"I take local herbs "Oloiren" and "Oloisuki"* (Participant 7). Another women added that she takes local medicine *"…to have an appetite to eat more, to feel light"* (Participant 11). The translator further explained that the local herbs mentioned were used to induce vomiting and diarrhea. Herbs are taken during times of sickness or after eating fatty foods as a way to "clean out" the mother. Although most women take local medicine to induce vomiting and diarrhea, two of the women

explained that the elders gave them local medicine for fever. One said, *"there is a medicine we call black okeshal [or] "Olevisi", it is used for pregnant women to help with cooling down our bodies, and helps with hydration"* (Participant 2). Another local herb used to help with fever is "lorpurkel". It is clear that Maasai women place great trust in the elders of the community and rely on their knowledge and expertise throughout their pregnancy.

In summary, the Maasai women interviewed in this study restricted dietary intake throughout their pregnancy, with a greater emphasis on the third trimester. The added chores, walking, and difficult workload during pregnancy further increases metabolic expenditure that they believe ensures small babies. Although cultural traditions dictate the diet and activity levels of many pregnant Maasai women, many of them understand the importance of a balanced diet and adequate rest during pregnancy.

4.1.6 24-Hour diet recall.

A 24-hour diet recall was given to all of the women, immediately after each interview (Appendix E). A template of pictures of commonly eaten foods in the NCAA was shown to each woman with the instructions to check each picture when eaten within the past 24 hours. If the food was eaten more than once in that time frame, they were asked to check how many times it was eaten. The variety of foods on each template included: maize porridge, milk, meat, vegetables, fruits, maize, nuts, beans, green leafy vegetables (GLV), and other. Most women reported eating maize porridge twice a day and drinking milk at least once a day. Very few reported eating meat, vegetables, or fruit during the day, with the majority only eating maize and maize products (Figure 1). It is clear that maize and maize products are a staple in this community, predominantly provided as government relief foods. Maize was reported as taken by eleven women on average at least twice a day.

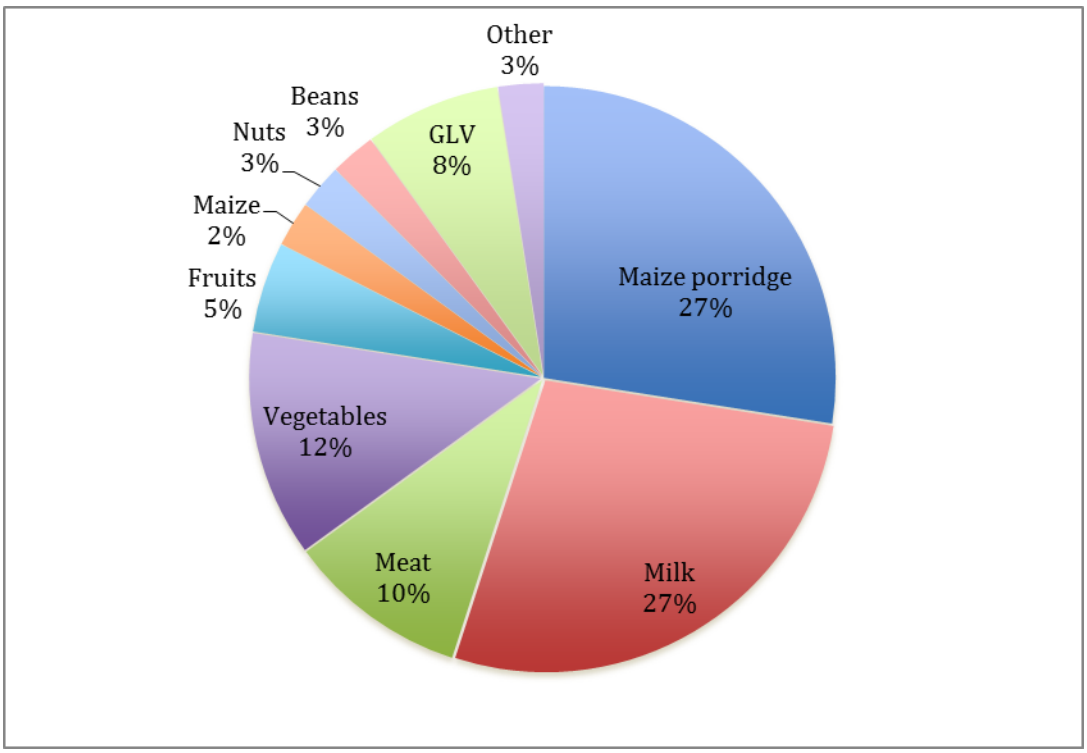

Figure 1. Food Consumption Patterns: Food Group Breakdown per 24 hour recall

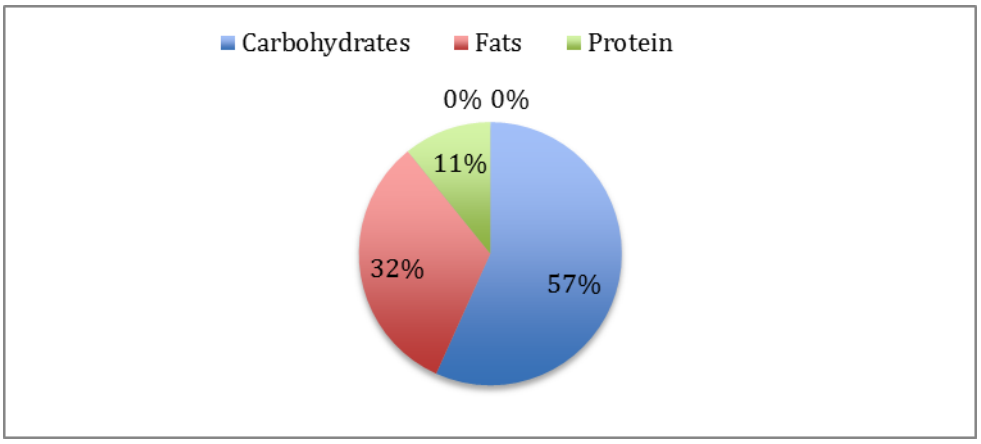

Figure 2. Macronutrient Breakdown per 24 hour recall

Figure 1 shows individual food group breakdown of the 24-hour diet recall. Milk and maize porridge are the most eaten foods (28%) with nuts and beans being the least consumed

(3%). Figure 2 indicates the breakdown of the macronutrients in the 24-hour diet recall. Carbohydrates constituted the highest consumption group (57%) of daily caloric intake followed by fats (32%), and proteins (11%).

4.2 Select Community Dialogues

While in Tanzania, the researcher established relationships with select community members. The following sections reflect on discussions which took place with community members, health care workers, and employees of the Mama Kwanza clinics. All of these discussions were conducted in English by the student researcher. These dialogues served to clarify certain information on Maasai culture and traditions respecting pregnancy that emerged from the women's interviews, as well as filling in missing or mis-information due to the translation process. As previously described, direct quotations are included to enhance authenticity of the content.

4.2.1 Physician at Mama Kwanza clinic/community member.

The physician at the Mama Kwanza Clinic in Olbalbal has worked in the community for two years, assessing, educating, and treating Maasai women. She is also a trusted member of the community. When asked what typical foods were during pregnancy for Maasai women, and if they differed from their pre pregnancy diet she replied, *"very little protein during pregnancy, no meat, no eggs some milk with porridge, very little veggies or fruit as they are unable to farm the land in the conservation area and can't afford to get veggies at the market."* When asked about portion sizes and if they cut their portions/nutrition during pregnancy she replied, *"They eat very little variety, and are made to work in the fields with the cattle, carry wood and supplies and take care of the children while pregnant which also increases their metabolism and ensures smaller babies."*

As a health care professional, she understands the importance of good nutrition and rest throughout pregnancy. She explained that, along with other clinic employees, there is a prioritizing of education of women who attend the clinic on nutrition and safe pregnancies, stating: *"some women will listen even though it goes against traditions but most will continue with traditional methods…the staff at the clinic does educate women on prenatal visits, vaccines, nutrition and delivery*." When asked about supplementation during pregnancy, she replied, *"No iron supplementation unless women attend the clinic for prenatal checkups then the clinic will give mothers iron plus folic acid to take during pregnancy, we also give malaria pills during pregnancy and tetanus vaccine."*

She further explained that many women do not attend the clinic for prenatal checkups, and seldom visit the clinic during their first and second trimester. The majority of women attend the clinic in their third trimester, or if there are any complications during pregnancy or at delivery.

When asked about premature babies or small for age babies at the clinic, the doctor replied, "*The average baby is 2-2.5kg, lots of small for age babies*."

When discussing breastfeeding practices in the Maasai community, she explained what mothers knew about breastfeeding, and exclusive breastfeed as follows: *"Mothers will breastfeed exclusively for 6 months and some will continue to breast feed up to 3 years for contraceptive purposes since their traditions are against any form on contraception*." She later elaborated that most women often introduce soft complementary foods prior to 6 months; however, this was still considered as "exclusive" breastfeeding by the Maasai mothers.

She stated that Maasai women are discouraged from using contraception. However, many women use breastfeeding as a form of contraception until the child is two or three years old. Some Maasai women will also attend the clinic for information on contraception, against their

husbands' consent, with the most popular medical contraceptive being the Depo-Provera© injection.

Lastly, the researcher asked the physician to explain any Maasai traditions which she believed to be unique to Maasai and which contribute to pregnancy practices. Her response was:

> *[They take] local herbs for nausea, [and for] abdominal pain women will make cuts in their belly and place herbs inside the cuts. They also don't have sex once a woman becomes pregnant, until she delivers, husbands will move on to the next wife as they have multiple wives. After delivery women will drink "oil of the sheep" or honey to induce diarrhea in order to "clean" out their system.*

4.2.2 Mama Kwanza clinic employee.

The second discussion was held with a Mama Kwanza clinic employee, who was also hired as the research assistant. The research assistant is Maasai, and a trusted community member. When asked about at typical Maasai diet during pregnancy in the NCAA, he answered, *"tea and porridge."* The researcher followed up by asking if women change their diet during pregnancy as opposed to pre pregnancy he answered, *"No, they eat based on the environment…what's available."* Even though he explained they primarily choose their diet based on food availability when asked if women avoided certain foods during pregnancy, he explained, *"yes, [they] limit meat and milk from five months till the end of the pregnancy and no eggs throughout their whole pregnancy."* As a clinic employee, he is very familiar with the programs and services provided by the clinic. When asked about how many small for age babies he typically sees at the clinic, he said, *"two or three out of ten [deliveries]";* however, he could not give an average weight. Although the physician explained that there are limited prenatal visits at the clinic and not many women receive supplementation during pregnancy, when asked

about it, the clinic employee explained, *"yes, women take supplements when they come [and] more women are coming for prenatal checkups."* He further explained that more women are beginning to come earlier for prenatal visits as opposed to solely in the third trimester or at delivery. When asked about prenatal education programs offered at the clinic, he said he didn't know much about the programs but they do offer education for women who attend prenatal visits relating to nutrition, vaccines, and healthy pregnancies. He did, however, explain why some women visit the clinic, saying, *"some of them come to ask about oral thrush, or if she is nauseous [and] she doesn't know what to do."* He continued to explain that most women who attend the clinic do not have a basic understanding of what they should be eating throughout their pregnancy saying, *"They know what they should not be eating but don't know what they are supposed to be eating."* Many of the women he sees seek some sort of nutritional advice throughout pregnancy when attending prenatal visits. As the previous community member mentioned, even though they may be aware of what is good nutrition during pregnancy, the women may not be able to follow through, due to lack of resources or contraindications with traditions (i.e., structural barriers). He also explained how many women take natural herbs while pregnant to induce vomiting or diarrhea saying, *"[They take] "Osokonoi" for diarrhea and sometimes vomit, "Oloyapyap" for vomiting, "Olchan Lorpukel" for fever."* It is clear that many Maasai women in this community are more likely to seek medical advice from relatives or elders of the community before health care professionals. When they do seek out advice from the clinic, they do not always follow through or comply. When asked if there was any other Maasai traditions or nutrition related issues in the NCAA he wished to discuss, he said, *"Some Maasai women eat sand cause they crave it. They also drink cow urine to make themselves vomit."* He further explained that he did not know why they craved sand. Darkish, Amine, and Abdullah (1982) defined pica as unusual cravings for unsuitable substances, which have little or no

nutritional value. Tierson (1997) further explained potential theories for pica during pregnancy to be for the relief of nausea and vomiting, or suggestive of a deficiency in nutrients such as calcium or iron, resulting in eating of non-food substances containing these nutrients. These behaviors highlight nutrition deficiencies that many Maasai women may experience throughout pregnancy. Due to the low incidence of prenatal visits, many women do not get the necessary supplementation throughout their pregnancies.

4.2.3 Physician in city clinic.

The last discussion was with a physician who specializes in women and reproductive health at the Kaloleni clinic the city of Arusha. She has been working at the clinic for two years with women's reproductive health. Although she does not see very many Maasai women, she is familiar with the pregnancy traditions and nutrition of women in the surrounding communities. When asked to explain a typical prenatal visit, she explained that most women attend the clinic in their third trimester, at which point they start iron and folic acid supplementation, as well as malaria vaccines and tetanus. Recently there have been more women coming earlier, closer to their first trimester, if it is their first pregnancy. As a result of beginning supplementation later on in the pregnancy, or not at all, she explained that many women come to their first prenatal visit complaining of eating soil and overpowering cravings. These complaints reiterate the issue that pertains to women in the NCAA with pica who eat soil to possibly fulfill a craving for iron. She explained nutritional education during visits at the clinic emphasizes as a balanced diet of fruits, vegetables, meat and grains and stating, *"A common diet [in pregnant mothers] is ugali (maize flour) and beans."* She encourages women to quit caffeine and black tea, saying *"no caffeine during pregnancy, or black tea because black tea will decrease the absorption of iron in*

mother." They also believe that women should stop smoking and decrease alcohol consumption during pregnancy, which they explain to expectant mothers at each visit.

The insights shared by the community partners were used to reinforce the findings of this study. Physicians at local clinics and the clinic employee revealed a different perspective. They are able to discuss the tools, education, and practices that they use to ensure proper PNC to women within the NCAA and surrounding area. Other data obtained includes the recommended international weight gain during pregnancy in relation to pre pregnancy weight as developed by the Institute of Medicine of the National Academies (2009) (Table 2).

Table 2. Recommended International Weight Gain during Pregnancy

Prepregnancy BMI	BMI (kg/m^2)(WHO)	Total Weight Gain Range (kg)
Underweight	<18.5	12.7-18.2
Normal Weight	18.5-24.9	11.4-14.5
Overweight	25.0-29.9	6.8-11.4
Obese (includes all classes)	>30.0	5-9

(Adopted from Institute of Medicine of the National Academies, 2009)

The chart shows the recommended international weight gain during pregnancy in relation to pre pregnancy weight. It is recommended on average to gain between 11.4-16kg, which converts to 11.33-15.87kg for a woman of normal weight during pregnancy. The physician explained that the range a newborn weight is 2-5kg, which is much wider than the birth weight range reported in the NCAA at 2-2.5kg.

CHAPTER FIVE

Conclusions and Implications for Practice

The purpose of this research was to understand traditions surrounding nutrition in pregnant Maasai women living in the NCAA and their beliefs on what constitutes a healthy diet during pregnancy. Two research questions were used for this study including:

1. What is the current dietary pattern of pregnant Maasai women living in the NCAA?
2. What are Maasai perceptions about the effect of diet on healthy baby outcomes?

The study used interpretive description in order to generate new constructs out of the data allowing the student researcher to, "see beyond the obvious, rigorously testing out that which we think we see, and taking some ownership over the potential meaning and impact of the visions" (Thorne, 2008 p. 142).

5.1 Relevant Themes

The initial data analysis process highlighted five themes, which encompassed the traditions, behaviors, and beliefs surrounding nutrition and healthy pregnancies in Maasai women living in the NCAA. Through the evaluation of these themes, findings were transformed into concepts for clinical practice in the area of prenatal nutrition for this group of women.

5.1.1 Food insecurity within the NCAA for pregnant mothers.

A common theme emerged throughout the interview process that emphasized the lack of food variability in the diets of pregnant mothers. Due to cultivation restrictions in the NCAA, Maasai women are more reliant on meat from their personal herds, naturally grown fruit/vegetables in the forest, and relief foods. In 2013, relief food was promised in the NCAA at 10 bags of maize annually per family, with a total of 7,000 tonnes to 87,000 residents in the

conservation area (Nkame, 2013). The majority of the women in the study reported eating primarily maize and maize products with very little naturally grown vegetables or meat, which is congruent with previous studies in the NCAA. One study reported that maize and maize flour were the most frequently eaten foods of Maasai women in this area (Martin et al., 2014 b). Study participants had a macronutrient breakdown of carbohydrates 80%, fats 12%, and proteins 8% (Martin et al., 2014b). Another study in 2012 that focused on the diets of pregnant Maasai women in the NCAA reported the macronutrient breakdown in the third trimester of pregnancy to be carbohydrates 64%, protein 21%, and fat 15% (Powell, 2012). These studies (Martin et al., 2014b; Powell, 2012) reported carbohydrates as the predominant food group, similar to the findings of this study which reported carbohydrates at 57% of daily caloric intake followed by fats at 32%, and proteins at 11%; however, each study differs with respect to reported protein and fat ratios. This is an area which could benefit from additional study and confirmation as these are critical ratios in terms of the maternal child outcomes.

A study on the breakdown of energy supply in Tanzania (2001-2003) showed that cereals contributed 51% of energy, followed by starchy roots 19%, animal food 7%, pulses/vegetable oils 6%, and fruits and vegetables 4% (FAO, 2006). Although this study is dated and pertains to the country of Tanzania, not specifically the NCAA, it would appear that Tanzanian families continue to rely on predominantly cereals and relief food as their energy source. With 28.2% of the population of Tanzania falling below the basic needs poverty line (NBS, 2013) reliance on cereals and relief foods has proven to be insufficient to sustain daily energy requirements.

Micronutrient deficiencies are also a potential in this community as a result of food insecurities and lack of food variability. A follow up study from Martin et al. (2014b) assessed Vitamin A, C and D status among Maasai women of reproductive age (15-49 years) living within the NCAA using serum markers. The results were compared to the recommended guidelines set

out by the TDHS (NBS, 2011). The results concluded that all participants were classified as deficient in vitamin A and vitamin C, with 16% of women also showing deficiencies in vitamin D (Martin et al., 2014b). Martin et al. highlighted major nutrient deficiencies in Maasai women, congruent with the findings of this study which showed lack of diet variation and vital nutrients. In comparison with other studies in this field it is clear that many Maasai women are unable to reach the RDI of these specific micronutrients.

5.1.2 Small babies are important for safe deliveries.

Avoiding big babies was the main priority for the women in the study. Through discussion with clinic employees in the NCAA, the newborn weight range was reported to be between 2-2.5kg with approximately 20%-30% of deliveries being categorized as small for age. In correlation with previous studies on pregnant Maasai women in the NCAA, Martin et al. (2014a) reported 90% of the women who restricted their dietary intake did so with the rationale that it would reduce the size of the neonate and ease delivery. Powell (2012) studied the effects of maternal diet in Maasai women on body weight and head circumference (HC), with the knowledge that as a proportion of total size, smaller infants have bigger heads. When Powell compared body weight and head size ratios, head size was unaffected (Powell, 2012). The study further elaborated that "fetal growth allometries for brain and body size are not tightly correlated; instead these allometries follow independent trajectories that reflect developmental trade-offs" (Powell, 2012, p. 39). Powell's study proposes that restricted maternal diets resulted in asymmetric growth, meaning that the facial size and shape was more affected than the cranial component. These findings suggest that infants experience brain sparing, which is a fetal response to preserve the oxygen and nutrient supply to the brain when in a state of placental insufficiency, such as severe malnutrition (Cohen, Baerts, & van Bel, 2015). These studies support concerns regarding Maasai beliefs, that a caloric deficit during pregnancy ensures

smaller babies thereby easing delivery. A calorie deficit during pregnancy will decrease fetal size, however with a less affected head size it is unlikely that it will be an easier delivery. In this study, maternal nutrient depletion and malnutrition were principal factors; therefore, asymmetrical intrauterine growth restriction (IUGR) would be more likely to be seen in this community. Another study reported that Maasai women related giving birth to big babies as a lack of discipline, failure to adhere to dietary restrictions, and a reason to be shamed, especially if the baby was big enough to need medical intervention during delivery (Roggeveen, Birks, Kats, Manyama, Hatfield, Bunders, Scheele, & Roosmalen, 2013).

In Tanzania, 10 percent of women of reproductive age (15-49yr) predominantly residing in rural areas are considered undernourished (MoHSW, 2008). Undernourishment in adult life, coupled with decreased caloric consumption during pregnancy, can adversely impact the fetal weight, with increased susceptibility to LBW infants. LBW is approximately 2.5kg meaning the average baby born at the Mama Kwanza clinic in the NCAA is classified as LBW. In 2015, maternal mortality rate in Tanzania was 398/100,000, and 642/100,000 in the NCAA, which includes all pregnancy-related cause during pregnancy or within 42 days of pregnancy termination (WHO, 2015; Roggeveen et al., 2013). Some of the Maasai women in this study believe that by restricting their diets, they are increasing their likelihood of safe deliveries, decreasing maternal mortality, and permitting them to deliver at home instead of in hospital.

A similar study by Roggeveen et al. (2013) reported that, although maternal mortality is a reality in the NCAA, most Maasai women did not perceive dietary restrictions as a significant risk during pregnancy. The most important concern to mothers and TBAs was the risk of obstructed labour, which they believe could be prevented by limiting fetal growth (Roggeveen et al., 2013). Major complications, which account for nearly 75% of all maternal deaths in developing countries are: severe bleeding, infections, high blood pressure during pregnancy (pre-

eclampsia/eclampsia), unsafe abortion, and complications from delivery (WHO, 2015). Complications from delivery are only a portion of the potential causes of maternal deaths. However, many Maasai women solely focus on promoting safe deliveries and preventing complications as a result of big babies. By working with tradition and promoting further prenatal education on safe pregnancies, there is a potential to decrease the incidence of maternal mortality and LBW infants born in the NCAA.

5.1.3 Elders and traditions are important in the Maasai community.

Like many cultures, the Maasai place great value on lived experience and the knowledge of elders in their own community. Similarly, in healthcare, people learn from storytelling, an approach of teaching and learning from lived experiences, used to educate, inspire, and transmit cultural mores (Keonig & Zorne, 2002; Collins & Cooper, 1997). The women in this study placed a greater value on learning from relatives, elders, and TBAs than on formal health care professionals. Most of the health care professionals within the NCAA are not Maasai, therefore women may view them as outsiders. The majority of the women in this study sought out guidance from family members, relatives, and their mothers-in-laws. The task of the elders and relatives, specifically the mother-in-law, is to regulate the diets and administer natural local herbs to women during pregnancy. Many of the women described the elders as the ones who regulate their food during pregnancy. They also administer local medicines used to induce vomiting and diarrhea if the women need to be cleaned of fatty or sugary foods. The majority of the women in the study reported a sufficient and balanced diet and getting food as an important contributing factor to a healthy pregnancy, despite local practices involving food restrictions and a limited variety of foods. Some Maasai traditions surrounding nutrition during pregnancy conflict with what the majority of the women believe contributes to a healthy pregnancy. Clinic employees reported they provide nutrition education to women who attend the clinic for prenatal

visits; however, many women do not to follow their guidance due to conflicts with traditional rules/guidelines.

The women in this study also placed a high importance on TBAs. TBAs are trusted woman in the community without conventional medical education, independent of the health system, who provide care during pregnancy, childbirth, and the postnatal period (WHO, 2004). An important strategy to improve PNC is to educate the entire community on the outcome of diet restrictions during pregnancy, and correct the misunderstanding that caloric restrictions promote easy deliveries. Previous qualitative studies on Maasai women in the NCAA highlighted that TBAs not only restrict the diet of mothers during pregnancy, but also advise expectant mothers to take natural medicine to induce vomiting in order to ensure smaller fetal size (Powell, 2012).

In order to ensure adequate and safe care during pregnancy and delivery, it is important to work with the community members and TBAs. The WHO, along with International Confederation of Midwives (ICM) and International Federation of Gynecology and Obstetrics (FIGO), developed a skilled attendant strategy to provide better health services to mothers in developing countries, particularly in rural areas (WHO et al., 2004). The strategy suggests that the best role for the TBA is to serve as a participant advocate for skilled care, encouraging women to seek care from skilled attendants (WHO, 2004). The strategy is also most effective when implemented within a good working relationship between TBAs, skilled attendants, and health care professionals at the community level (WHO, 2004). In light of the findings of this study, it would be important to work with the TBAs, who are highly trusted by the prenatal mothers, to ensure adequate dietary uptake while respecting the cultural practices. Such efforts might include jointly identifying locally available alternative sources of macro/micronutrients necessary for the prenatal period.

5.1.4 Maasai women face conflicts between beliefs and recommended practices.

The Maasai women in this study restrict their dietary intake while inducing vomiting to limit fetal growth; however, some reported being reluctant to do so. Some of the Maasai women also reported following food restrictions only while being monitored within the NCAA, once outside the NCAA they allowed themselves to eat restricted foods. These insights show that some Maasai women understand the importance of adequate nutrition during pregnancy, but seem conflicted with regard to compliance with traditional practices. It is unclear from the literature and from this small sample what the likelihood and predictors of women's adherence to traditional practices.

Clinic staff reported that more women were attending the clinic for prenatal visits earlier in their pregnancies. The clinic staff in the NCAA also reported an increase in Maasai women seeking out information on healthy pregnancy practices and proper nutrition, but it is not clear whether or not they choose to follow these new practices or combine them with existing practices. So, although the majority of the participants felt that a balanced diet is important during pregnancy, as well as adequate rest and avoidance of work, it is unclear whether the PNC and health literacy efforts on nutrition and activities are appropriate for these women. These findings suggest that some Maasai women are open to attending prenatal check-ups and educating themselves on healthy pregnancy practices. This finding would suggest that an emerging opportunity exists to address the prenatal nutrition needs and to work with the women to achieve a balanced diet throughout this critical time.

In other studies, Maasai women were found to initially decrease their workloads in the first trimester due to fatigue, and steadily increased their workload throughout the pregnancy, with an inordinately more intense workload during the third trimester (Powell, 2012). The findings of this study support the findings in the Powell study regarding intensity of workload.

However, Powell (2012) found that many of the women reported an intense workload throughout the entire pregnancy, adding that even though they were tired, they had to do it because no one else would. Both studies reported that women were in charge of collecting water, firewood, and cooking meals for the family. The Powell (2012) study added that women prepare for the postnatal period, when the women remain inside their bomas for three months to recover from pregnancy. All of the pregnant mothers in the current study reported being responsible for an increased workload during pregnancy, which may signify preparation for the postnatal period. These responsibilities, which have persisted for generations, reflect the lack of power that Maasai women hold in this male dominated community. This lack of control places the Maasai women at greater risk for nutritional deficiencies and pregnancy related complications due to the increased workload and decreased caloric consumption.

The majority of women in this study reported that they believed *"avoiding work"* was important to a healthy pregnancy, adding that they *"needed resting time."* The women of the Powell study, which focused on diet and fetal size restriction, did not report women's perceptions on what is harmful and helpful during pregnancy; however, reported that the increased workload during the third trimester helped to induce labour, saying, *"the extra work helps to make the birth easier; it helps the baby come"*(Powell, 2012, p. 32). In this study, the women did not elaborate as to why they increased their workload only that it was their job as no one else was to help them. There is a mutual understanding of the women in both studies that the increased workload, which increases their metabolic expenditure, is used to promote small babies. Women are responsible for collecting the food and cooking the meals, however they are fed last with little consideration for the amount of food they are left to eat. Maasai women are powerless to address their own physical needs, often citing tiredness and hunger throughout their pregnancy.

The patriarchal nature of this social group places pregnant women at a greater risk to food insecurities in a community already plagued by malnutrition, and poverty. Diet restrictions, intense workloads, and limited control of food intake during pregnancy can add potential stress, anxiety, and increase nutrient depletion causing strain to the pregnancy. In light of these realities, there is an imperative to reflect on the potential for diminished agency as described by Limerick, Moore, and Coyle (2015). "Despite women's contribution to household food security and economic viability, patriarchal family and social structures deny women real property rights in land, limit women's access to and control over the proceeds of their own labour, and constrain their decision-making roles" (Jiggins, 1989, p. 953). Recalling that a feminist theory of agency (which relates to their capacity for individual choice/action and to achieve desired outcomes) considers how or if it is possible for women in male-dominated societies to live in ways that reflect their needs and concerns. Maasai women are embedded in a structural context (isolation, genderized power relations, inter-generational power structures, and lack of access to resources) which not only impede but actually restrict their personal choices. With respect to adherence to nutritional restrictions and options in food choice, this was especially evident within the communities living in the NCAA as opposed to study participants in the city of Arusha. Although this research did not specifically explore a sense of agency within the women, it is evident that there are limitations on women achieving their personal choices in a range of matters such as nutrition, access to services, and other activities. It is possible that participating in this research study and telling their stories is a means of exercising agency as described by Lindemann Nelson (2001).

5.1.5 Living conditions increase barriers to seeking health care.

Few previous studies have focused on barriers to accessing prenatal education and health care during pregnancy for Maasai women in the NCAA. The current study reveals women's

views of barriers to PNC such as long travel to and from clinics (tired from overworking), traditional beliefs, and *"*difficult environments*"*. The research assistant further elaborated that the term "difficult environments", is an umbrella term used to describe poor living conditions, long walks to and from clinics, as well as the fear of wild animals, and walking alone in the darkness. One study, which focused on barriers to accessing health care in the NCAA from 2009-2011, reported that Maasai women were bound by birth plans and husbands' approvals prior to seeking any medical attention during pregnancy (Roggeveen et al., 2013). Findings accentuate the male dominated society, which leaves the women powerless during their pregnancies. Delivering outside the home without a TBA is also seen as a failure, where only 7% of women reported using skilled birth attendants during their deliveries (Roggeveen et al., 2013). As previously mentioned, the women in this study hold the opinions of relatives in high regard so it is reasonable to assume approval of their husbands and community would deter them from seeking medical intervention during pregnancy. Other barriers reported by Roggeveen et al. (2013) included transportation. Many women have to walk long distances to the nearest clinic, and, even if families own cars or motorbikes, the roads were often in too poor of condition. This finding is congruent with the results of this study, in which most women reported walking long distance to and from the clinic as a deterrent to their attendance at prenatal checkups. Many women in this study also mentioned feeling very tired, due to an intense physical workload and decreased nutritional support, and therefore the mothers opted to stay home most days rather than walking to the clinic. Lincetto et al. (2006) reported barriers to healthcare for women in Tanzanian as the inability to pay for medical care, conflicts or poor communication between TBAs and health care providers, and lack of knowledge relating to danger signs during pregnancy and delivery. Some clinics within the NCAA are free of charge or charge minimal fees while others are more expensive, which deters the women in the community from attending

if they feel it was not medically necessary. The Mama Kwanza clinic employees mentioned during their interviews that they have attempted to educate TBAs on proper delivery techniques, offering teaching seminars with local midwives and attempting to establish trusting relationships. These efforts were not always favoured by TBAs who view medical intervention as unnecessary for a natural life process. Additionally, the TBAs viewed some of the attempts as stepping on their territory, which might add to the animosity between TBAs and health care professionals. Without the consent of TBAs, Maasai women were further deterred from seeking outside health professional advice. Other barriers for pregnant women observed include low literacy levels as well as low education levels, especially for the women in the rural communities. Although not the main objective of this research, barriers to seeking professional health services was found to be an important factor in providing prenatal nutrition education to Maasai women living in the NCAA.

5.2 Implications for Practice

Recommendations for practice at the community level include: developing and facilitating PNC programs conducive to the needs of Maasai women in the NCAA, while recognizing and working with existing barriers to access. In rural communities with strong traditional beliefs, seeking medical advice from an outside health care professional is usually a last resort, due to mistrust, apprehension, or fear of going against their traditional practices (WHO, 2004).

This study also found cost was a barrier to Maasai women seeking medical advice. Promotion of PNC in the community begins with inviting women to openly discuss traditional practices, concerns with seeking medical care, and promotion of safe births at home. Programs need to be tailored towards proper nutrition during pregnancy, and earlier prenatal supplementation of iron and folic acid. Education at the clinic level should focus on the

appropriate growth during pregnancy, and the open, culturally safe discussion of cultural food practices that focus on the necessity of food restrictions for a safe delivery. To ensure women are comfortable in a health care facility, providers should encourage women to bring family members, husbands, TBAs, and/or friends. Group education sessions may facilitate a safe environment where women are able to openly express concerns, discuss PNC, traditional practices, and what they wish for their own pregnancies. This is a critical opportunity for knowledge mobilization as well as the facilitators, with the research evidence from this study, may be able to bring forward new ideas, options, and an informed dialogue on the prenatal nutrition concerns and needs. This approach will allow for transparency and inclusiveness across groups and sub-populations in a manner which is non-judging and potentially increases community awareness. Little, Motohara, Miyazaki, Arato, and Fetters (2013) studied the effects of prenatal group programs on new immigrants to the United States with limited English skills. The participants evaluated the group programs, with 90% reporting satisfaction in being with other pregnant women; had an increased understanding about PNC; increased preparedness for labour and delivery; improved organization of visits; and increased preparedness for newborn care (Little et al., 2013). Encouraging attendance through group prenatal classes with the inclusion of TBAs, elders, and family members could further increase participation in prenatal education and facilitate learning in the community. Involving community members in education sessions on proper nutrition, growth, and understanding that restrictions does not equal easier deliveries, can aid in facilitating changes within the community, and potentially offering alternative information and co-sharing information respecting PNC. Facilitating groups programs should also focus on building relationships between TBAs and health care workers, demonstrating that both partners can work together within the community while seeking culturally safe practice environments which invite a mutual consideration of traditional practices.

TBAs have been critical of health care professionals in the community in the past; therefore offering culturally safe community centered care may encourage TBAs to participate in education sessions, prenatal visits, home visits, and focusing on improving healthier outcomes for pregnant women in the future.

Other barriers to medical care perceived by Maasai women include environmental factors, transportation, and distance from the clinics. The Maasai women seeking care at the Mama Kwanza clinic tend to live a fair distance and have to walk to and from the clinics. Due to monetary constraints of the clinic and community members, it is unfeasible to provide transportation; however, providing group prenatal visits could also encourage women in neighboring communities to walk together and support each other. Another option would be to provide home visits by clinic staff. Home visits could reduce barriers by supplying educational information on PNC directly to the women without the stigma of entering the clinic and/or the stress of walking to and from the clinic. Although, it may be unfeasible every day to facilitate home visits, it could be possible to provide one or two home visits per women during her pregnancy. Another option could be to encourage women in neighboring communities to gather at one house, whereby medical staff could reach multiple women during a single home visit.

The findings of this study may contribute to improve the nutritional status of pregnant Maasai women living in the NCAA by encouraging provisions of culturally sensitive nutritional education in collaboration with local community members and TBAs. Education within the community, as provided by local health care professionals, should focus on educating mothers in the area of proper nutrition, appropriate birth weight, safe deliveries, supplementation, and the importance of taking rest during pregnancy. Although many women understood the importance of a balanced diet, they were either unaware of what a balanced diet involves, or were physically unable to achieve this balance.

The women in this study also emphasized the importance of delivering at home as opposed to needing medical intervention. In Maasai culture, a successful birth is considered a home delivery with the help of community members or the Wakunga, rather than inside a clinic or hospital. Although perhaps a cultural ideal, there are circumstances which can make such a scenario unlikely. Opportunities exist to educate TBAs and welcome them into the clinic, with the hopes of facilitating safe and effective deliveries either at home or at the clinic. Midwives are an asset to the clinic and to the women. Although they may not be viewed as natural birth facilitators, they may begin to close the gap between health professionals and TBAs.

Trust and comfort in the Maasai community are important foundations in providing prenatal education and support. Community leaders and TBAs are influential in how and when the Maasai women seek medical care throughout their pregnancy. By building a relationship with community members, local health care providers could potentially improve quality and uptake of PNC. This research can also influence the quality of education given to women during prenatal visits and promote community awareness on healthier pregnancies and births.

5.3 Implications for Research

The results of this study may inform further research on PNC in the NCAA and surrounding areas with similar pastoralist populations. Most importantly, an opportunity exists to extend studies into the area of nutrient deficiencies in pregnant Maasai women living in the NCAA, supplementation during pregnancy, and/or food fortification programs. These findings highlight the issue of gender inequality in relation to inadequate food distribution and workload, which provides a potential research program direction.

At a local level this research may inform changes to programs currently offered at the Mama Kwanza and community clinics, which embed traditional beliefs, focus on nutrition, and on evidence based practice respecting safe births at home. Although not the main focus of this

research, the findings may catalyze future research on gender equality issues within the NCAA that prevent women from seeking medical care and maintaining a balanced diet during pregnancy. Further research on the strategies and impacts of educating women on PNC, supplementation, and nutrition may enable women in taking control of their needs during pregnancy. Efforts in research may include building knowledge respecting the implications of caloric restrictions on safe deliveries. By promoting an understanding of the mechanisms behind growth restriction, cultural practices may change, and encourage the reconsideration of food restrictions in pregnant Maasai women.

At the national and global levels, this study highlights the need for appropriate macronutrient and micronutrient studies in select populations. Study participants reported eating very little variety, with their diet predominantly consisting of maize and maize products. The lack of dietary variety may contribute to a gap in nutrients, leaving the women susceptible to micronutrient and macronutrient deficiencies. Although this study did not measure such deficits, the traditional practices of excluding meat and dairy throughout their pregnancy, possibly leaves Maasai women protein deficient. The prevalence of pica highlights the potential for iron-deficiency anemia, which can be a risk factor for preterm deliveries, low-birth weight, and for inferior neonatal health (Allen, 2000). Hence, more research on policies for food fortification and supplementation programs in resource-limited context are needed. A study done on the use of iron fortification in Vietnam, China, and South Africa showed decreased incidence in iron deficiency anemia with the introduction of iron fortified foods such as fish sauce, soy sauce, and curry powders (Allen, Benoist, Dary, & Hurrell, 2006). The findings in this study indicate a need for food fortification in this community. Iodine deficiency disorders, and vitamin A deficiencies are not proven or highlighted in this study; however, the results of this study can act as a reference on potential nutrient deficiencies may inform future research directions for testing or

monitoring nutrient deficiencies in pregnant Maasai women.

5.4 Implications for Policy

An opportunity exists to guide future policies to better accommodate and improve the impact of the social determinants of health on Maasai women. This research can inform and catalyze local policy by focusing on accommodating traditional beliefs and building relationships with TBAs and clinic staff to facilitate safer home births and/or provide culturally safe prenatal care and deliveries within a health care facility. The findings of this study are relevant within the socio-economic environment of the Maasai people, which lacks the basic resources and supports to meet minimum standards for life. The inability to cultivate the land leaves the Maasai without basic human needs, thereby forcing them to rely on relief foods as their primary dietary source. The National Strategy for Growth and Reduction of Poverty II (NSGRP II) acknowledges agriculture and livestock production as a "growth driver" in the reduction of malnutrition, and poverty in rural communities (Ministry of Finance and Economic Affairs (MoFEA), 2011). The NSGRP II strategies include efficient water irrigation for cattle and crop production, prevention of diseases, and investments in small-scale farmers (MoFEA, 2011). These strategies overlook pastoralists, who have very little support from government to secure land and resources whilst allowing private investors and crop growers to encroach on their livelihood (Kipuri & Sorensen, 2008). According to Kipuri and Sorensen, many policies lack the understanding of the benefits of pastoralism as a production system or a sustainable livelihood. For example the Maasai usually do not have to rely on government support to overcome seasonal droughts and diseases affecting livestock numbers. These research findings can inform government policies specifically in the domain of food aid programs, by increasing a focus on variability of relief foods with the imperative for more nutrient dense foods, specifically for pregnant and lactating women. In addition, this study's findings highlight multiple barriers for women accessing early PNC with

specific significance on delayed commencement of proper nutrient supplementation. Hence, these results can influence policies relating to reducing barrier such as programs to more widely distribute free prenatal and postnatal supplementation, concomitantly improving access by women in their local communities to such services.

Results of this study can also influence further research based evidence to provide the Maasai women with a voice to informing future government policies on improved food fortification programs, better quality of relief food for pregnant women and children, and more widely distributed free prenatal and postnatal supplementation within the NCAA communities.

5.5 Implications for Theory

This study addressed the concepts of food security and within the NCAA with a specific focus on prenatal women's nutritional needs within a theoretical frame of cultural safety. A need was recognized for further exploration of culturally safe care in local clinics within the NCAA, primarily focusing on PNC program and policy development. The majority of the health care workers within the NCAA are not Maasai, and therefore have the potential of conveying unsuitable techniques, advice, and practices on Maasai women when seeking medical care. As defined by Williams (1999), cultural safety is creating an environment encompassing the spiritual, social, physical, and emotional safety of patients. Cultural safety is recognizing the patient's whole identity, with a shared understanding of respect, meaning, knowledge, and experience of learning together (Williams, 1999). Cultural safety in the NCAA means working with Maasai women, local community members, family members, and TBAs on how they believe care should be implemented throughout pregnancy. By encouraging the community members to voice their needs in PNC they can begin to influence TBAs and other prominent community leaders, to work alongside health care professionals, empowering Maasai women and enabling them to contribute to their own personal care. The women in the NCAA revealed

apprehensions on seeking medical advice during their pregnancy for fear that they will go against the values and wishes of their family members. The discussions with the women in this study portrayed a need for culturally safe PNC embracing traditional beliefs and values, while working with the TBAs and community members.

The findings of this study also outlined a need for the exploration and the development of a theoretical understanding of food security within the NCAA using a cultural safety lens. These insights focus on influencing government policy and program development within the NCAA which are inclusive of cultural food practices, and seek means to integrate, augment, and complement such practices to ensure equity. Further exploration into food availability, food fortification programs, and access to adequate food sources is necessary to sustain food stability within the NCAA inclusive of a cultural assessment and Indigenous knowledge systems. This study indicates the need for further investigation at a theoretical level which respectfully considers the Maasai perspective on food security and culturally safety. It also invites future research into the inclusion of cultural practices in food security effort globally.

5.6 Knowledge Translation

The main purpose of this research was to increase awareness, to inform future research in this area of study, and to influence policy makers on nutrition for pregnant women in this community. The target audience includes the women themselves, local community members, the clinical program managers in the field of maternity and PNC, and government policy makers. In addition, it is possible that this study may help other nurses venturing into similar settings and/or working with newcomer populations to reflect on cultural aspects of care.

Academic strategies to disseminate this research will include publication of a Master's thesis, presentations at local conferences relating to global health, prenatal education and nutrition, and contributions to peer-reviewed journals, such as the *Tanzania Medical Journal,*

Tanzanian Journal of Health Research, and *The Journal of Health Population and Nutrition*. At a more local level, dissemination of research information will include a summary of the study, which will be made into a poster and include key information relating to research results in a format which is easily understood by all clinic employees and clients visiting the Mama Kwanza Clinic. Such a format will include pictures, and written summaries in plain English language for easy translation into Swahili and Maa. Consideration will be given to mechanisms to share the findings which use social media approaches, such as inclusion on the *Health Information for All* listserv which has extensive international and notably sub-Saharan Africa reach. The research assistant also holds great potential in the knowledge translation efforts related to this project given his unique position within the community and his role in this study. It will be incumbent upon the student researcher to support his continued involvement in the process not only in the translation of information to 'give back' to the community but also to enable him to share with others within the community. He was an integral part of the research team and, as such, will be important in the next phases to maximize the impacts and reach of this work.

5.7 Limitations of the Study

Although under the supervision of an experienced researcher, a novice researcher and novice research assistant conducted all interviews and diet recalls. The first limitation relates to the development of the diet recalls and interview guides. As there was no specific pre-existing tool, the student researcher in consultation with the supervisory committee developed the instrument. It is recognized that the diet recalls were developed using Westernized images of local foods; however, all foods were labeled in plain language and translated for each woman. Despite this effort, there may have been confusion for some of the women regarding quantities and types of foods eaten during a specific day. The interview guide was developed in plain language using open ended questions; however, during the interviews, most of the women

answered with only one to two words which often limited interpretation. Future iterations might include a more extensive repertoire of follow-up questions rather than probes only in order to ask a question in a couple of ways. It is also recognized that the perceived position of power of the interviewer/researcher may contribute to this succinct answering pattern. To address this particular issue one might consider a more prolonged engagement in the community which potentially generates familiarity and comfort with process and person.

Due to unexpected circumstances, a second limitation was the inability of the primary (student) research to conduct ten of the interviews within the NCAA, leaving the research assistant to collect the interviews and dietary recalls. It is reiterated that the research assistant was a local member of the community, of Maasai descent, and fluent in Maa, Swahili, and English. Although the research assistant has gained trust in the community, it is acknowledge that he was a male Maasai conducting interviews with female Maasai about diet and pregnancy. This interface could have created bias and/or limited the interview content by creating a perceived power imbalance in the interviewer/interviewee relationship.

A third limitation of the study is the potential for misinterpreted information due to translation from Maa either to Swahili or directly to English during the ten interviews performed in the NCAA or in translation from Swahili to English in the two interviews performed in Arusha. Nes, Abma, Jonsson, and Deeg (2010) discussed how language difference in qualitative research may have consequences in loss of meaning, or the misinterpretation of the expression of words or how they are perceived. In one example, they explained how the term "walking" which, in Dutch was translated to *wandelen*, was found to have a more complex meaning including the "intrinsic enjoyment of the activity, enjoying nature and its associations with Sunday afternoons and holidays together" (Nes et al., p. 314). It was determined after a full extrapolation that the term for 'walking' as they wished to represent it in the interview was *lopen*, which was translated

as “to move from one place to another on feet, only as instrumental transportation” (Nes et al. p. 314). This example shows how words, phrases, and meanings can be lost, altered, or convoluted through translation, and highlights how, as a researcher, important it is to address these potential biases throughout the interview process. Murray and Wynne (2008) highlight the necessary steps to address prior to using a translator to conduct participant interviews, which include “finding an interpreter; briefing the interpreter and researcher; identifying the role of each conversant in the interview; conducting the interview; and collecting data” (Murray & Wynne, p. 8). In this study, finding a translator was limited to who was available and trilingual. The research assistant, was trilingual, with previously established roots in the community, and had previously helped with research projects in this community, although was a novice interviewer. The research assistant was also briefed by the student researcher on the interview prior to data collection. At that time, he was given an outline of each interview with instructions to ask any follow up questions if given the opportunity. In addition, he was also informed on how to properly collect the 24-hour diet recall. Some of the risks associated with translation and a secondary interviewer were potentially mitigated through digitally recording interviews which provides the researcher with the opportunity to cross-check certain words or phrases which may have been hard to interpret when hand written, helping with the validation of findings (Murray & Wynne).

Another limitation identified in the literature arises when using a translator in multiple roles, including “the three-way production of data; selective translation; reliability of interpretation; impartiality of the interpreter; and confidentiality” (Murray & Wynne, p. 16). Involving three people in the interview and data transcription process can begin to add in different perspectives, where both the translator and researcher have adopted the role of attempting to gain perspective for the participant’s answers (Murray & Wynne). In this study, the research assistant was the sole person interviewing the ten participants in the NCAA, which,

although unplanned, potentially enabled more immersive connection in the interviewer/interviewee relationship. The two interviews performed in Arusha were with a translator and student researcher. In order to maintain the interviewer/interviewee relationship, the student researcher only discussed participant's interviews with the translator once the interviews were completed, but the presence of the translator may have impacted the integrity of this connection.

Selective translation often occurs when the translator attempts to convey the message of the participant (Murray & Wynne) and was a potential limitation in this study. As the research assistant was a local community member and of Maasai descent this may have been minimized as he was familiar with the language as a native speaker and like able to capture and shift the meaning of each participant to English with minimal 'selective translation' as opposed to an outsider or a non-Maa native speaker as a translator who may have conveyed different meanings. The interview questions were kept simple in order to ensure understanding and concise answers thereby minimizing subjective interpretations or loss of meaning, again decreasing selective translation.

In order to ensure reliability of interpretation throughout the data transcription process, the research assistant and student researcher worked together to clarify each (relevant) word and the meaning of participants to ensure authenticity of each interview. Impartiality of the translator can happen when the translator is of the same culture, background, or religion of the participants and becomes protective over how it may be portrayed in the interview (Murray & Wynne). This was not evidenced as a limitation in this study perhaps, in part, that the research assistant participated across a number of the aspects of the data management and interpretation. He appeared to be honest throughout the entire research process, not only during the interviews, but also during a discussion with the student researcher, elaborating on certain customs, traditions,

and beliefs of the Maasai people. In order to ensure honesty and confidentiality, the research assistant also signed a confidentiality agreement developed by the student researcher in order to keep all names, and demographic information private.

5.7 Conclusion

This research study provides further information on the dietary patterns of pregnant Maasai women living in the NCAA, as well as the perceptions of diet and influences infant outcomes. The intent was to reveal and reflect on the current nutrition practices (both culturally and non-culturally constructed) of a select group of prenatal Maasai women.

Traditional food habits are meant to serve a nutritional purpose in a tribe or culture; however, some tribes, such as the Maasai, practice what Latham (1997) calls food taboos. Food taboos are practiced by the whole tribe, or sometimes groups of the tribe i.e., pregnant women, or women during the postnatal period (Latham, 1997). Food taboos originate from logic and some are from past tales where the certain foods may have caused sickness to the tribe and continues to be carried on for years under the same assumption that it would still cause sickness or harm if eaten (Latham). A traditional Maasai diet for women, generally consists of unpasteurized milk with small amounts of animal protein and blood, this high fat, low carbohydrate diet contributed to their lower rates of heart disease and cholesterol (Campbell, 2015). With the passing of the *Ngorongoro Act of 1975* and the increased oppression by the Tanzanian government, the Maasai strayed from their traditional diets into a diet consisting of primarily maize and maize products through government relief food programs. Prior to these dietary changes, when the Maasai women were expected to restrict caloric consumption and limit food intake in the third trimester, they may have been better equipped, physically and mentally, to handle the food restrictions. The findings of this study reported that during pregnancy Maasai women ate mainly maize and maize

products with very little milk, and little to no protein. The diet recalls showed a macronutrient breakdown of carbohydrates at 57% of daily caloric intake followed by fats 32% and proteins 11%. These findings suggest a drastic change in their traditional diets leading to an unintentional caloric deficit further exacerbated by cultural traditions and food limitations during pregnancy. Although the women in the study reported limited high fat and high sugary foods, many did not mention the capability to attain these foods. This gap in findings along with the need to further explore women's agency with respect to prenatal food control and traditional interventions (such as herbal administrations) holds potential for future research.

Nutrient deficiencies are a large problem in Tanzania, including within the NCAA. However, due to the lack of research within the NCAA, there is limited information on nutrition and nutritional deficiencies. The few studies that focus on nutrition within the NCAA, including this one, highlight a need for further research to evaluate food fortification and supplementation programs for pregnant Maasai women. This study is aimed at benefiting the women who participated and future pregnant women in this setting. In a previous study by Petrucka, Bassendowski, Dietrich-Leurer & Athuman (2015), the women of NCAA indicated that they were committed to change not only for themselves but also "for our daughters" in terms of maternal and child health care.

Another area with lack of research is the perceptions of pregnant Maasai women in the NCAA regarding how nutrition can affect healthy baby outcomes. It is clear the dietary restrictions in which pregnant women are expected to follow during pregnancy, however many of these rules and restrictions are forced on these women due to lack of relief food variability, lack of the ability to cultivate the land, lack of monetary support, and lack of government support to maintain their traditional diet and livelihoods. The importance of education on proper nutrition and prenatal practices while discrediting the myth that caloric restrictions equal safe deliveries

remains; however, without significant structural adjustments including government policy shifts, many of these women will still be restricted in their dietary choices.

This research has implications for researchers, policy makers, and health care professionals working with pregnant Maasai women in the NCAA. Opportunity exists for future researchers to further evaluate potential nutrient deficiencies in pregnant Maasai women and target specific nutrients, supporting the need for prenatal supplementation and food fortification programs. This research also provides opportunity for further programming in local clinics to better accommodate pregnant Maasai women and their cultural traditions. Continuing to work closely with TBAs and community members helps to decrease gaps, which currently exists between the two groups and demonstrates the need for cooperation between health care professionals and TBAs in order to facilitate the best programs for a healthy pregnancies.

Barriers to accessing health care for expectant mothers could also be reduced by providing home visits and group educational sessions. Group sessions can improve access to nutritional education, and provide a safe environment where women feel comfortable to learn about prenatal education and share personal experiences. This research aims to aid the direction of future programming by highlighting the needs of the Maasai women during pregnancy, their views on nutrition, and their beliefs to ensure healthy pregnancy outcomes.

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Appendix A: Terminology

Maasai People - A tribe of semi-nomadic cattle farmer, who inhabit southern Kenya and Northern Tanzania. Their population is approximately 500,000 (Maimai, 2006). Their native language is Maa.

Developing Countries - The World Bank (2015) classifies countries based on estimates of Gross National Income (GNI) per capita. Tanzania is classified as a low-income country meaning its GNI per capita is less than $1,045 (World Bank). In 2014, the GNI in Tanzania per capita was $920 (World Bank, 2016).

Nutrient Deficiencies – Includes a condition of inappropriate nutrition (Rice, Keith, West, & Black. 2004). Often related to specific nutrients such as vitamin A, iron, iodine and zinc which have been recognized as adversely affecting humans (Rice, et al)

Appendix B: Consent Form

Project Title: Understanding the Diet of Pregnant Maasai Women in Ngorongoro Conservation Area Authority.

Researcher: Jessica Lennox, RN, Master's Student, College of Nursing, University of Saskatchewan.

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Phone: (Tanzania) 07-761-383-911, **U of S Phone**: 306 337-3811

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Purpose and Objective of the Research: To gain knowledge regarding the current dietary patterns of Maasai women living within the Ngorongoro Conservation Area Authority during pregnancy. This study will provide insight on the women's perception of how diet impacts mother and child health outcomes.

Procedures:

To participate in this study you need to:

- Live within the Ngorongoro Conservation Area Authority
- Be a Maasai woman
- Be currently pregnant

Participation in the study involves:

- At least one interview, less than an hour long, and will involve a 24-hour diet recall, which will take place immediately after each interview.
- A 24-hour diet recall will require each woman to identify which type of foods were eaten at what time each day. If one type of food was eaten more than once in a day, the women will state how many times each food was eaten.
- The interview and 24-hour diet recall will be digitally recorded in order to transcribe each line verbatim into English.

The interview will be held at the Mama Kwanza clinic in Obalbal and time that is convenient to the woman within the working hours of the clinic.

Funded by: Department of foreign affairs trade and development

Potential Benefits and Risks: Your participation may help us with better prenatal education and care for Maasai women at the Mama Kwanza Clinics and may help with further research that can lead to positive changes to health education in the NCAA. It is likely that you will not benefit by being part of this study. Participation in this study does not involve any known risks.

Compensation: If you choose to participate in the interview and/or the 24-hour diet recall you will receive a 5000 TSH phone card for participating.

Confidentiality: The information that you share won't be shared with anyone except my supervisor and thesis committee. Although parts of your interview may be used when this research is published and/or presented, your name or personal details will not be used so no one will be able to identify you by your responses. Your information will be secured and password protected. Other data from the study, including all digital recordings, a copy of this consent form, will remain in a locked cabinet at the University of Saskatchewan in the College of Nursing, Regina Campus for five years, after five years the paper will be shredded and any electronic information will be wiped from the computer.

Right to Withdraw: Your participation is entirely voluntary, and your decision will not in any way affect the services you receive at the Mama Kwanza clinics. You can answer only those questions that you are comfortable with. You may choose to withdraw from the study at any point without explanation or penalty, at which time your documents and data will be removed from the study and destroyed. If you leave the study after I have done the analysis, I will not be able to take your information out.

Follow-Up: Once completed, results of the study will be available at the Mama Kwanza clinic for any interested participants in the form of a written report. A poster display, which will summarize key findings of the research, will be mailed back to the clinic to be displayed. When necessary (ex; illiterate participants) clinic staff can discuss the research findings to participants.

Questions or Concerns: This research project has been approved on ethical grounds by the University of Saskatchewan Research Ethics Board. Any questions regarding your rights as a participant may be addressed to that committee through the Research Ethics Office ethics.office@usask.ca (306) 966-2975.

Please check the box/boxes to tell us which part(s) of the study you will participate in:

□30-60 minute interview

□24-hour food recall

Consent to Participate:
I understand the study and want to be a part of it. I asked any questions and my questions have been answered. I know that I may leave the study at any time. A copy of this consent form has been given to me.

Oral Consent to Participate:
I read and explained this Consent Form to the participant before receiving the participant's consent, and the participant had knowledge of its contents and appeared to understand it

_____ (Name of Participant)

_____ (Date)

_____ (Researcher)

_____ (Date)

UNIVERSITY OF SASKATCHEWAN
College of Nursing

Jina la mradi: kuelewa mlo wa mama mjamzito wa kimasai katika mamlaka ya hifadhi ya ngorongoro.

Mtafiti:
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Barua pepe : pammla.petrucka@usask.ca

Madhumuni na malengo ya utafiti; kupata kujua na kuelewa lishe na milo ya wamama wajawazito wa kimasai wanaoishi katika mamlaka ya hifadhi ya ngorongoro. Huu utafiti utasaidia kutoa mwoono wa upande wa wanawake jinsi gani lishe inachangia kwenye afya ya mama na mtoto.

Taratibu:
Kushiriki kwenye huu utafiti unahitaji ku:

- Uwe unaishi kwenye Mamlaka ya Hifadhi ya Ngorongoro
- Uwe mwanamke wa Kimasai
- Uwe mama mjamzito

Ushiriki katika utafiti kuhusisha:

- Mahojiano yasiyo zidi saa 1. Na itahusisha ukumbukaji wa mlo wa saa 24 zilizo pita ambayo itafanyika baada ya mahojiano
- Ukumbukaji wa mlo wa saa 24 zilizo pita utahitaji kila mwanamke ataje chakula gani alikula na wakati gani ndani ya siku. Kama kuna chakula kililiwa zaidi ya mara moja mwanamke atabidi aseme ni mara ngapi kila aina ya chakula kililiwa.
- Mahojiano na ukumbukaji wa saa 24 za mlo utarekodiwa na kuhifadhiwa kidijitali kwa nia ya kutafsiri maongezi kwenda kingereza

Mahojiano yote yatafanyika katika kliniki ya mama kwanza iliyopo olbalbal na mdaa ni ambao utamfaa mwanamke kipindi cha mdaa wa kazi clinic

Wafadhili idara: Idara ya biashara ya masuala ya nje na maendeleo.

Faida na hasara zake: Ushirikiano wako utatusaidia kutambua ni jinsi gani ya kutoa huduma na elimu ya mama wajawazito wa kimasai katika kliniki ya mama kwanza, na kusaidia katika utafiti wetu wa elimu ya mama mja mzito wa kimasai katika hifadhi ya ngorongoro. Ushirika wako katika zoezi hili halitakuadhiri kwa namna moja au nyingine ila utachangia kufanikisha utafiti wetu.

Fidia: washiriki watakaoshirikiana nasi katika zoezi hili la mahojiano watapewa vocha ya shilingi elfu tano (5000)

Usiri: mahojiano yote yatakayofanyika yatabaki kua siri baina yako na sisi. Hatuta vujisha taarifa na mahojiano tuliofanya na muhusika. Mahojiano yako yatahifadhiwa katika chuo cha unesi kilichopo kanada kwa muda wa miaka mitano na baada ya hapo taarifa zitafutwa kabisa.

Haki ya kujitoa: Washiriki wote wana haki ya kuendelea kushiriki katika mahojiano na pia wana nafasi ya kujitoa iwapo wataona hawapo huru kujibu maswali wanayo ulizwa. Na pindi mshiriki anapochukua uamuzi wa kujitoa katika mahojiano taarifa zake zitafutwa haraka, vile vile kama mshiriki akijitoa kabla zoezi zima halijaisha hatutaweza kuchukua taarifa zake.

Ufuatiliaji: Baada ya kumaliza zoezi zima la mahojiano majibu yote yatapatikana katika kliniki ya mama kwanza. Hivyo basi washiriki wote ambao watahitaji kupata mrejesho mzima wa majibu wataombwa kufika katika kliniki.

Maswali au mapendekezo: Utafiti huu umeidhinishwa na kikundi cha haki za binadamu na bodi chuo kikuu cha Saskatchewan. Kwa maswali yeyote kuhusu haki zao washiriki wanaombwa kuwasiliana na ethics.office@usask.ca (306) 966-2975.

Tafadhali chagua aina ya mahojiano ambayo utapenda kushiriki katika zoezi lote:

□ dakika 30-60 za mahojiano

□ kutueleza mlo uliokula masaa 24 yaliopita

ridhaa ya kushiriki:

Nimeelewa madhumuni ya utafiti na ningependa kuwa mmoja ya washiriki. Nimeuliza maswali yote na nimejibiwa kwa ufasaha. Na nime elewa kuwa naweza kujitoa katika katika utafiti huu mda wowote. Na nimepokea nakala ya utambulisho, ridhaa hii.

Ridhaa ya mdomo kwa washiriki: Nime wasomea na kuwaelezea ridhaa yote kwa washiriki kabla sijapokea mshiriki yeyote na kabla hawajatia saini, na wameonekana kuelewa na kuwa tayari.

_____ (jina la mshiriki)

_____ (tarehe)

_____ (mtafiti)

_____ (tarehe)

Appendix C: Data Collection Tools

Demographic Data:

Age:

Marital Status:

Number of Children:

Ages of Children:

Takwimu za wakazi:

Umri:

Hali ya ndoa:

Idadi ya watoto:

Umri wa watoto:

Appendix D: Interview Guide

What types of food do you eat most day?

How do your foods differ during rainy or dry season?

Where do you get your food from?

Would you say you eat more/less/about the same amount now that you are pregnant?

How much more do you eat now that you are pregnant?

In your household, who is fed first? Who is fed last? How does this affect how much food you get? How does this affect what food you get?

How have you been feeling so far during your pregnancy? Strong? Tired? Upset stomach?

Do you feel sick, or do you vomit during your pregnancy? Do you take local herbs or local medicine to help with sickness? If so, what kinds of herbs?

Can you explain what Maasai traditions for diet/foods you follow during pregnancy?

What traditional foods do you eat while you are pregnant? Why?

What foods do you avoid while you are pregnant? Why?

What do you think helps make the baby healthy while you are pregnant? Do you do this in your own pregnancy?

Can you tell me about your pregnancy so far?

Tell me about what things or people help you during your pregnancy? e.g., family members, friends, local health providers (TBAs).

Tell me about anything that makes it hard to have a healthy pregnancy/ healthy child?

Tell me what you know about what is good for you during pregnancy and what is bad?

Is there anything you feel that you can or should change to help your baby grow during your pregnancy?

Is there anything you want to ask me?

Mwongozo wa mahojiano:

Ni aina gani ya chakula uancho kulaga mara nyingi kwa siku?

Tofautisha vyakula unavyo kula wakati wa masika na kiangazi?

Ni wapi unapata vyakula vyako?

Je utasema unakula sanaa/kidogo/kawaida katika kipindi hichi cha ujauzito?

Ni kiasi gani zaidi unakula kipindi hichi cha ujauzito?

Kwenye kaya yako, nani wa kwanza kulishw? nani wa mwisho? Na je ina kuathiri vipi kiasi cha chakula unachopata?

Je unajisikia upo kwenye hali gani,kipindi hichi cha ujauzito? una nguvu? Una choka sana? Kuumwa na tumbo?

Je unajiskia kuumwa , au unatapika? Na unatumia dawa za mitishamba au kiyenyeji? Na ni mitishamba ipi unayotumia?

Naomba utuelezee ni milo ipi ya kimasai unatumia kipindi cha ujauzito?

Ni vyakula gani vya asili unakula wakati huu wa ujauzito? Na sababu

Ni aina gani ya vyakula unaepuka kutumia wakati huu wa ujauzito?

Unadhani ni vitu gani vinampa mtoto afya wakat una ujaauzito? Je unafanya hivyo kwenye ujauzito wako?

Unaweza kutuambia kuhusu ujauzito wako had sasa?

Niambie kuhusu vitu au watu wanao kusaidia wakati huu wa ujauzito. mfano: familia, marafiki, vituo vidogo vya afya?

Ni kitu gani kina kuwia ugumu kupata afya nzuri ya uzazi/au ya mtoto

Niambie ni unajua nini kuhusu kipi kizuri kwako kipindi cha ujauzito nakipi kibaya?

Kuna kitu una hisi unaweza au unatakiwa kubadili ili kumsaidia mtoto wako akuwe wakati wa ujauzito?

Je kuna swali lolote unapenda kuniuliza?

Appendix E: 24 Hour Diet Recall

The foods were chosen for the template based upon previous research by Martin, Petrucka, and Buza (2013), who conducted a 24-hour dietary recall assessment of Maasai women living in the NCA.

Day 1 (check each food group eaten, if eaten more than once, check food group how many times it was eaten in that day)

Carbohydrates	Fats	Protein	Vegetables	Fruits
 Maize Porridge	 Milk	 Meat	 Mixed Vegetables	 Fruit
 Maize	 Nuts	 Beans	 Green Vegetables	? Other

Siku ya kwanza(angalia kila aina ya chakula cha kuliwa, angalia vyakula ulivyo kula mara ngapi kwa siku ya jana)

Nafaka	mafuta	protini	Mboga za majani	matunda
 uji wa mahindi	 maziwa	 nyama	 mboga za majani	 matunda
 Mahindi	 karanga	 maharage	 mboga za kijani(majani) mfano kabichi	? nazinginezo

Appendix F: Recruitment Poster

Understanding the Diet of Pregnant Maasai Women in Ngorongoro Conservation Area Authority

WHO?

Pregnant Maasai women living in the Ngorongoro Conservation Area.

HOW?

A 30-60 minute private interview about how you eat now that you are pregnant and a 24-hour diet recall to talk about what foods you ate that day and why.

TO THANK YOU

Women who participate will receive a 5000 TSH phone card for helping us with this research. If you choose to participate in only one part of the study, either the interview or the 24-hour diet recall, you will still receive a phone card.

IF YOU WOULD LIKE TO PARTICIPATE

Please speak to the receptionist at the desk to sign up for a time to be interviewed at the clinic.

QUESTIONS?

If you have any questions, please contact Jessica Lennox, Graduate Student, College of Nursing, University of Saskatchewan. Email: jll924@usask.ca

Kuelewa mlo wa mama mjanzito wa Kimasai katika hifadhi ya Ngorongoro

NANI?

Wa Mama wajawazito wa kimasai wanaoishi katika hifadhi ya ngorongoro

JINSI?

Dakika 30 mpaka 60 ya mahojiano ya jinsi ya mlo unaotumia katika kipindi chako cha ujauzito na kutuelezea mlo wako wa kipindi cha saa 24 zilizopita.

KUWASHUKURU

Kwa kushukuru wakina mama wajawazito wote wataoshiriki watapewa shilingi elfu tano (5000)

ya vocha kwa kutusaidia katika utafiti wetu. Kama ukiamua kushiriki katika moja wapo ya somo, iwe ni mahojiano au maswali ya utambuzi wa chakula gani ulikula mda wa saa 24 uliopita bado utapokea vocha

JINSI YA KUSHIRIKI

Fika katika cliniki na uliza sehemu ya dirisha la mapokezi kwa ajili ya kujiandikisha ili kupata mdaa wa kufanya mahojiano.

MASWALI

Kama una maswali tafadhali wasiliana na Jessica lennox, muhitimuwa, chuo cha unesi Saskatchewan. Barua pepe; jll924@usask.ca.

Appendix G: Confidentiality Agreement

It is understood and agreed to that as a member of the research team I am expected to keep study participant information confidential and out of public eye. To ensure the protection of such information, and to preserve any confidentiality necessary, it is agreed that

1. The Confidential Information to be disclosed can be described as and includes:names, signatures, times and dates of interviews, and any personal characteristics of study participants.
2. I agree not to disclose the confidential information obtained from the study to anyone outside the research team.

I have read and understand this agreement and voluntarily accept the duties and obligations of being part of the research team.

Member of the research team

Name:

Signature:

Date:

Primary Researcher:

Signature:

Date:

Appendix H: Budget

Costs are based on 12 participants, a translator, transcriber and recruiter:

Honoraria for Participants: phone card	5000 TZS ($3 CDN) x 12 = $36 CDN
Supplies for Participants: Pens	$10 CDN
Printing Costs (Posters for Recruitment, Pamphlets, Consent forms, Food logs)	$5 CDN
Fees for Transcriber/Translator/Recruiter (2-3 hours avg $8 per interview)	$15 x 10 = $150 CDN
Interview Supplies (Journals, AAA batteries)	$40 CDN
Travel to Tanzania ($1800 avg. flight)	$2078.11 CDN